Response Action Work Plan
Libby Asbestos Project
Libby, Montana

February 2008

DCN: DC2616.012.207.TOMGT-2532.00
Revision 2

Prepared for:

EPA
Region 8

U. S. EPA Region 8
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Acronyms and Abbreviations

A&E	architectural and engineering firm
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACM	asbestos-containing material
AHA	activity hazard analysis
AHERA	Asbestos Hazard Emergency Response Act of 1986
AMS	Agricultural Marketing Service
ANLA	American Nursery and Landscape Association
ANSI	American National Standards Institute
ARM	Administrative Rules of Montana
ASTM	American Society for Testing Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWWA	American Water Works Association
bgs	below ground surface
BMP	best management practices
BOCA	Building Officials and Code Administrators
BZ	breathing zone
CDM	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CIC	community involvement coordination
CRSI	Concrete Reinforcing Steel Institute
CRZ	contamination reduction zone
CSHASP	Comprehensive Site Health and Safety Program
DAR	final draft design analysis report
DEQ	Department of Environmental Quality
DOT	U. S. Department of Transportation
EC	electrical conductivity
eLASTIC	electronic Libby Asbestos Sample Tracking Information Center
EPA	U. S. Environmental Protection Agency
ERRS	Emergency Rapid Response Services
F	Farenheit
ft^3	cubic feet
GFCI	ground fault circuit interrupter
GPS	global positioning system
H&S	health and safety
HEPA	high efficiency particulate air
hp	horsepower
HVAC	heating, ventilating, and air conditioning
IAG	inter-agency agreement
IECC	International Energy Conservation Code
LA	Libby amphibole
Landfill	Lincoln County Asbestos Landfill
LO/TO	lockout/tagout
MCA	Montana Code Annotated

meq	milliequivalents
mmhos	micromhos
MSDS	material safety data sheet
MSHA	Mine Safety and Health Administration
MSP	Manual of Standard Practice
NEMA	National Electrical Manufacturers Association
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NPE	negative pressure enclosure
NRMCA	National Ready Mixed Concrete Association
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PCC	Property Closeout Checklist
PCM	phase-contrast microscopy
PDIWP	final draft pre-design inspection work plan
PDI	pre-design inspection
POCV	point-of-cut-ventilated
PPE	personal protective equipment
psi	pounds per square inch
QA	quality assurance
QC	quality control
R-value	thermal resistance value
RAWP	response action work plan
RITA	Research and Innovative Technology Administration
RFP	request for proposal
SAP	Response Action Sampling and Analysis Plan
SAR	sodium absorption ratio
SHSO	site health and safety officer
SSHASP	site-specific health and safety plan
SSVR	small scale vermiculite removal
STEL	short-term exposure limit
TEM	transmission electron microscopy
TMMB	Truck Mixer Manufacturers Bureau
TWA	time weighted average
VCI	vermiculite-containing insulation
Volpe Center	John A. Volpe National Transportation Systems Center
w/c	water to cement ratio
wr	water reducing admixture
yd^3	cubic yards

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Section 1
Introduction

The U. S. Environmental Protection Agency (EPA), Region 8, is conducting response actions at residential, commercial, and industrial properties located in Libby, Montana, to address the risk to human health caused by exposure to Libby amphibole (LA) asbestos. LA asbestos exists in a variety of sources, such as soil, vermiculite-containing insulation (VCI), and interior dust. This Response Action Work Plan (RAWP) outlines the approach to conducting the removal of these sources.

1.1 Inter-Agency Agreement

Through an inter-agency agreement (IAG), the U. S. Department of Transportation (DOT), Research and Innovative Technology Administration (RITA), John A. Volpe National Transportation Systems Center (Volpe Center) is providing environmental engineering and removal support to EPA. Support activities include procuring removal and other contractors, preparing response action plans and designs, conducting response actions, providing response action construction management, and preparing technical studies and reports. Currently, the Volpe Center is providing support for the removal of LA asbestos-contaminated materials at properties located in Libby, Montana (hereafter referred to as the Libby Project).

1.2 Document Purpose

The purpose of this RAWP is to describe the technical requirements of the Libby Project, define roles and responsibilities of all Libby Project resources (i.e., EPA, Volpe Center, and their contractors, collectively referred to as the Libby Team), and to serve as a guidance document for the Libby Project as it proceeds. Each property in Libby is unique and may also require site-specific changes or modifications to the response actions described in this document. A site-specific RAWP Addendum and its associated contract drawings (hereafter collectively referred to as a site-specific work plan) will be prepared for each property requiring removal activities. The site-specific work plan will detail the extent of contamination, required removal activities, and restoration plans. The site-specific work plan will be reviewed and agreed upon by the property owner and representatives of the Volpe Center, EPA, architectural and engineering firm (A&E), and the removal contractor before remediation activities commence.

The RAWP includes an Appendix A (Construction Specifications) and an Appendix B (A&E Air Monitoring Frequencies, Record of Modification form). The reader is referred to the *Response Action Sampling and Analysis Plan* (SAP), *Revision 1, Libby, Montana* (CDM 2008c), a separate document, for details on sample collection procedures, analytical methods, and applicable quality assurance (QA) procedures.

The RAWP complements documents prepared by EPA, Volpe, and the A&E that detail other aspects of residential and commercial cleanup in Libby. Other documents include the *SAP* (CDM 2008c), *Pre-Design Inspection Work Plan* (PDIWP), *Revision 1, Libby, Montana* (CDM 2008b), *Final Draft Design Analysis Report* (DAR), *Libby, Montana* (CDM 2003), *Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical*

Memorandum (EPA 2003a), *Comprehensive Site Health and Safety Program* (CSHASP), *Libby, Montana* (CDM 2006), *Dust Sampling and Analysis Plan, Libby, Montana* (EPA 2003b), and *High Efficiency Particulate Air (HEPA) Vacuum Program Memorandum, Libby, Montana* (Volpe 2003).

As necessary, this RAWP will be modified to reflect EPA requirements and changes in the scope of the project. Modifications will be documented via the Record of Modification form in Appendix B or site-specific work plans.

1.3 Background

The City of Libby is located in northwestern Montana, approximately 25 miles east of the Idaho border and 40 miles south of the Canadian border, situated within the Kootenai River Valley, just north of the Cabinet Mountain Range (Figure 1-1). The residential and commercial sites are located in and near the City of Libby, Montana (Figure 1-2). Libby is the site of the former largest vermiculite mine in the world, which had been operational for 70 years. In the 1920s, the Zonolite Company formed and began mining vermiculite. In 1963, W.R. Grace bought the Zonolite mining operations. The mine closed in 1990. While in operation, the vermiculite mine in Libby may have produced 80 percent of the world's supply of vermiculite. Vermiculite has been used in building insulation, building aggregate, and as a soil conditioner. It has been determined that the vermiculite from the Libby mine was contaminated with naturally occurring asbestos, a solid solution series of asbestiform mineral fibers that includes tremolite, actinolite, winchite, and richterite. For convenience, this solid solution series is herein referred to as LA.

In response to local concern and news articles regarding asbestos-contaminated vermiculite, the EPA sent an emergency response team to Libby, Montana, in late November 1999. In December 1999, the EPA team collected nearly 700 samples (air, soil, dust, and bulk insulation). In January 2000, EPA released the indoor air sample results to property owners and eventually to the media and general public. Through additional sampling, these response actions have grown to include remediation activities at various former vermiculite processing areas, as well as commercial and residential properties.

EPA is currently conducting response actions in Libby using removal authority under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), allowing the agency to quickly evaluate and remediate contaminated properties.

1.4 Quality Assurance

The Libby Team has established a formal QA program to ensure a high level of quality is maintained throughout all stages of the project. The QA program includes, but is not limited to, independent review of deliverables; planning and conducting assessments and audits; and ensuring any noncompliance discovered during assessments or audits are corrected. All removal action work performed by the A&E under the RAWP is conducted in accordance with quality procedures described in the A&E's *Quality Assurance Manual* (CDM 2007) as modified by the *Quality Implementation Plan* (CDM 2008a).

Technical proposals and work plans require a QA section. A member of the A&E QA staff has prepared this RAWP section and will maintain QA oversight for the duration of the work conducted under the RAWP.

File maintenance, storage, and control for all original remedial action field documentation are conducted at the A&E field office in Libby, Montana. Copies (electronic or hard copy, as applicable) of field documentation are maintained at the A&E office in Denver, Colorado. Project documentation produced by the A&E is indexed and tracked by the Libby file administrator. Copies of all relevant documents will be provided to the Volpe Center on a periodic basis as identified by the Volpe Center project manager. Electronic data is ultimately stored in the Libby2 project database, which is housed on a secure EPA server in Denver, Colorado, and managed by the Volpe Center database manager. In addition, limited data is entered into Field Operations Central Information System databases in Libby, Montana, and provided to the Volpe Center database manager electronically by A&E. Global positioning system (GPS) data is currently stored in the GPS database. Maintenance of project databases is provided by A&E database support personnel, with Volpe Center consultation. Details regarding project data storage and associated QA/quality control (QC) mechanisms (e.g., QC checks) are included in the SAP (CDM 2008b).

The QA program includes both self-assessments and independent assessments as checks on the quality of the data and reports produced during this task order. The A&E QA Director determines the frequency of field and office audits, considering client requirements as well as the scope and duration of the work. Office and field audits will each be performed at least once per 12-month period or more frequent, if requested by the Volpe Center project manager.

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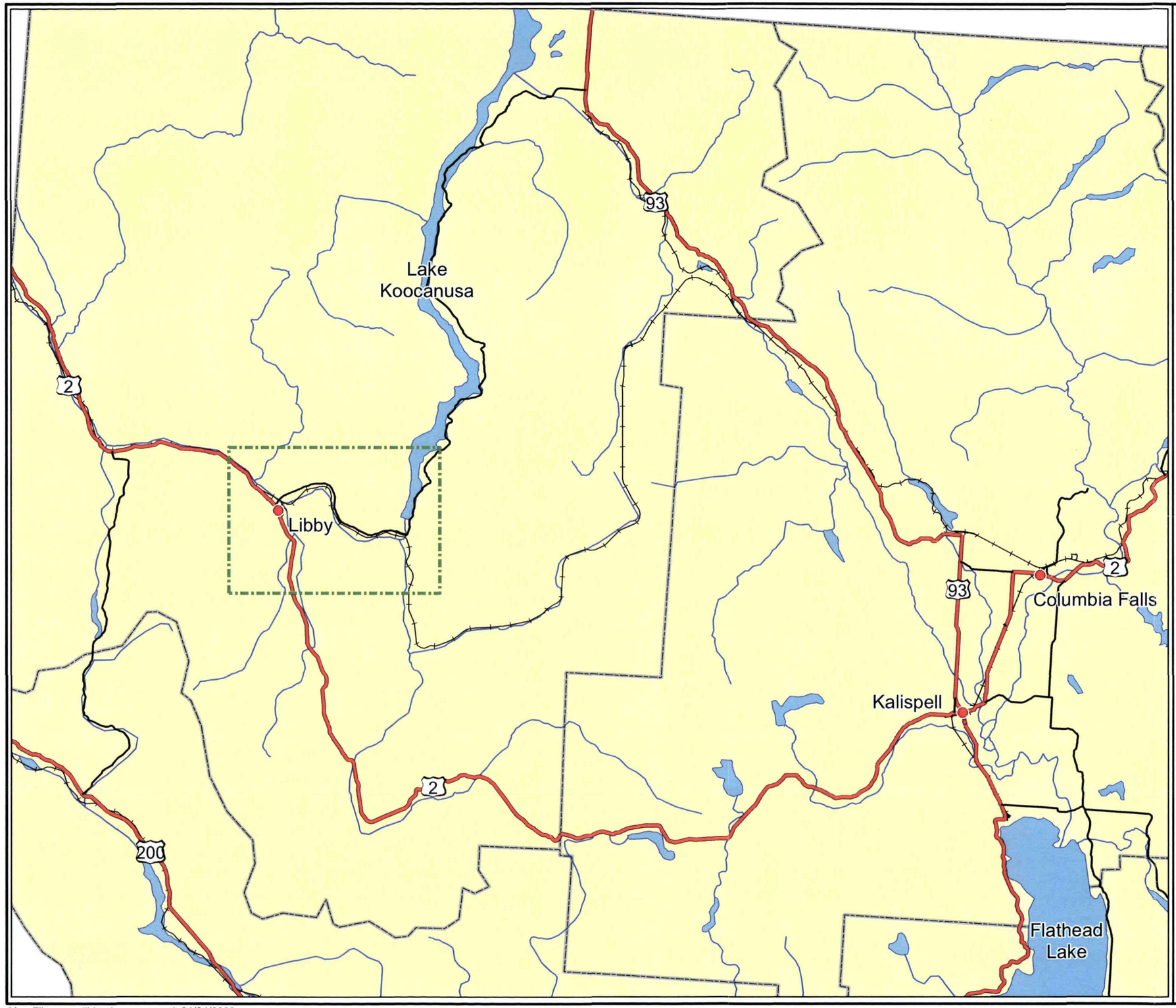
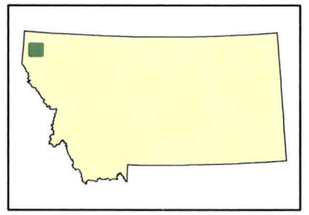
Figure 1-1
Site Location Map
Libby Asbestos Site
Lincoln County, Montana



Legend

- Highway
- County Boundary
- Roads
- Railroad
- Approximate Site Boundary
- Water
- City



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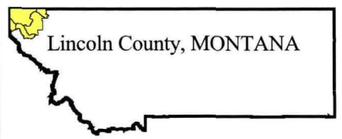
Locus Map



Rainy Creek Road

Mine Site

Lincoln County Landfill

Libby Dam

Former Export Plant

Former Screening Plant

Plummer Elementary School

KDC Bluff Property

KDC Flyway

Libby High School

Libby Middle School

Kootenai River

McGrade Elementary School

Area of Response Action

Libby, Montana

Figure 1-2

1 0 1 Miles

CDM

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Section 2
Roles and Responsibilities

The Libby Project team consists of EPA, the Volpe Center, the A&E, the removal contractors, and other contractors. The roles and responsibilities of these team members follow.

2.1 EPA

EPA is the lead agency for the Libby Project, with overall responsibility for implementing the project's response action activities. EPA responsibilities include, but are not limited to, the following:

- Providing overall direction and planning for the project's response action activities
- Providing funding to the Volpe Center for implementing response action activities
- Providing funding for the EPA Emergency Rapid Response Services (ERRS) contractor, or other contractors, for their participation
- Approving plans prepared for implementing response action activities
- Supporting Technical Advisory Group, Community Advisory Group, Operations and Maintenance Group, Environmental Resource Specialist, and onsite EPA manager activities
- Coordinating response activities with the community and local, state, and federal agencies as needed
- Maintaining the IAG with the Volpe Center
- Obtaining access agreements for all activities to be conducted on government and private property

2.2 Volpe Center

EPA has an IAG with the Volpe Center for managing response action activities on the Libby Project. Volpe Center responsibilities include, but are not limited to, the following:

- Providing contractual procurement and management of necessary removal contractor response action activities
- Providing contractual procurement and management of the A&E for planning; design; community involvement, including the EPA Information Center; laboratory analysis; health and safety; technical support; and cleanup oversight efforts
- Procuring and managing other subcontractors as needed including, but not limited to, those providing common fill, topsoil, landscaping, and security
- Providing environmental engineering and remediation services

- Providing general construction management and support for all project response actions including, but not limited to, LA asbestos-contaminated soil, insulation, and dust removals; interior and structure demolitions; and subsequent restoration activities
- Providing and managing project disposal efforts (e.g., Lincoln County Asbestos Landfill [Landfill] operations and contract for disposal; mine site repository operations)
- Providing administration and closeout of contracts
- Providing site representation for EPA
- Assisting EPA in planning project response activities
- Acquiring project background data and regulatory information as needed
- Reviewing the CSHASP and the removal contractor's site-specific health and safety plan (SSHASP)
- Reviewing design documents provided by the A&E
- Assisting in preremoval meetings with the resident, A&E, and removal contractor to discuss remediation activities
- Meeting on a daily basis with contractors during the field construction season
- Populating and managing the project database (Libby2), providing QC checks
- Providing progress tracking of the project
- Supporting community relations during remediation activities, including residential relocations and per diem payments
- Providing administrative record support

2.3 A&E Contractor

Under a contract with the Volpe Center, the A&E will provide architectural and engineering support for response actions on the Libby Project. A&E responsibilities include, but are not limited to, the following:

- Providing investigative and design efforts to identify properties that require project response actions
- Preparing site-specific work plans for properties determined to require project response actions
- Preparing amendments, revisions, and modifications to site-specific work plans as necessary
- Providing the Volpe Center with a schedule of daily project removal and restoration progress

- Assisting the Volpe Center with onsite construction management for site removal and restoration activities
- Providing construction oversight of all removal and restoration activities by the removal contractor(s) to ensure compliance with approved site-specific work plans and project removal criteria
- Providing health and safety (H&S) oversight and technical support for site removal and restoration activities, including the Landfill and the mine site repository
- Documenting inspections and QA/QC checks of property removal and restoration activities as necessary
- Collecting investigative and confirmatory samples (e.g., soil, water, air, dust) as they relate to response actions
- Collecting stationary (perimeter) air samples in accordance with the SAP (CDM 2008c) throughout the duration of soil removal activities, and as necessary to evaluate project operations
- Collecting personal task-based air samples in accordance with the SAP (CDM 2008c) and Air Monitoring Frequency table (Appendix B)
- Evaluating the results of all investigative and confirmatory samples as they relate to project action level criteria
- Evaluating the results of all personal task-based and stationary air samples, recommending engineering controls and personal protective equipment (PPE) requirements as necessary
- Providing sample coordination services to generate chain-of-custody forms and coordinate analysis of samples
- Procuring analytical laboratory services for project samples
- Providing laboratory coordination services to ensure reporting consistency between subcontracted laboratories
- Producing and revising project guidance documents as necessary
- Procuring surveying services, as needed, for properties requiring soil excavation
- Providing community involvement coordination (CIC) support (e.g., documenting and discussing all planned remediation activities with property owners, notifying neighboring residents of activities)
- Recording digital photos of properties before, during, and after removal and restoration activities
- Collecting GPS data for site properties as required by the Volpe Center

- Populating the electronic Libby Asbestos Sample Tracking Information Center (eLASTIC) and Property Closeout Checklist (PCC) databases, providing quality control checks, and exporting data daily to the Volpe Center
- Maintaining property files that include, but are not limited to, sample data, CIC information, required activity documentation, digital photographs, and EPA correspondence
- Providing copies of all project documentation (e.g., field sample data sheets, inspections, observations, removal checklists) to the Volpe Center, as requested
- Recommending engineering controls and design standards to the Volpe Center as they relate to project activities

2.4 Removal Contractors

The removal contractors will provide construction services (e.g., contaminated soil, insulation, and dust removals) as they relate to project response activities. Removal contractor responsibilities include, but are not limited to, the following:

- Obtaining, reading, and understanding project guidance documents, providing training to removal contractor personnel on their contents
- Attending pre-cleanup activity site walks at the properties
- Preparing an SSHASP and addenda, when necessary
- Establishing a safe work environment for all project personnel
- Identifying and acquiring the necessary permits for project activities
- Setting up and maintaining a field office/equipment staging area
- Acquiring utility clearance through Montana U-Dig (800-551-8344) and/or private locate firms
- Ensuring that the site supervisor attends a tailgate meeting to determine that both A&E oversight and the removal contractor have the most current site-specific work plan
- Coordinating with the A&E to document existing site conditions before beginning set-up activities
- Recording digital photos of properties before, during, and after removal and restoration activities
- Preparing interior and exterior work areas for removal actions by constructing necessary containments and decontamination stations
- Removing LA asbestos-contaminated soils, insulation, dust, and other materials in accordance with site-specific work plans and project removal criteria

- Implementing and monitoring engineering controls for construction impact mitigation (i.e., dust control)
- Transporting and disposing of LA asbestos-contaminated soils at the mine site repository or other EPA-approved location in a protective manner in accordance with DOT regulations
- Transporting and disposing of LA asbestos-contaminated insulation, dust, construction debris, and other materials at the Landfill or other EPA-approved location in a protective manner in accordance with DOT regulations
- Coordinating with the Volpe Center and A&E for clearance sampling
- Restoring properties in accordance with the site-specific work plans
- Restoring final grades to provide proper drainage
- Maintaining a site health and safety officer (SHSO) to fulfill the duties as described in this document and the CSHASP
- Documenting regular and frequent site inspections performed by competent person(s) and the SHSO, covering the full-range of site removal and restoration activities, and making this information available to the Volpe Center at the biweekly H&S meetings
- Performing cost tracking as required by the Volpe Center
- Providing adequate pre-work training for its site employees on the requirements contained within the CSHASP, SSHASP, and the RAWP
- Providing supervision and training of subcontractors for adherence to project protocol
- Adhering to requirements in all project contract documents
- Complying with Occupational Safety and Health Administration's (OSHA) general industry requirements

2.5 Other Contractors

Other contractors may be procured by EPA, the Volpe Center, or the A&E to provide fill material, landscaping, laboratory analysis, surveying, security, Landfill operations, government-contracted lodging for residential relocations, and other materials and services. Their responsibilities include, but are not limited to, the following:

- Providing materials or services in accordance with the contract documents and as directed by EPA, the Volpe Center, or the A&E
- Coordinating with EPA, the Volpe Center, or the A&E to provide access for sampling activities, QA inspections, or audits

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Section 3
Design Activities

The A&E is responsible for providing site-specific work plans for the response actions. The following sections briefly describe the design activities, including pre-design inspections, land surveys, and design work that will be conducted. Additional details of these activities are described in other documents, as discussed below.

3.1 Pre-Design Inspections

The A&E will conduct pre-design inspections for the response activities. These inspections expand on an individual property's remedial investigation and help determine what response activities are needed to remove the contaminated soils, insulation, and dust from the property, or to otherwise reduce exposure. Pre-design inspections may include inspecting the interior and exterior of property structures, collecting soil and dust samples, and conducting interviews with tenants and/or owners to confirm information on the location of LA asbestos-contaminated materials. All pre-design inspection activities, including soil sampling, field sketches, building descriptions, etc. will be conducted in accordance with procedures outlined in the PDIWP (CDM 2008b). Dust sampling will be conducted in accordance with the *Dust Sampling and Analysis Plan, Libby, Montana* (EPA 2003b).

The property information and analytical data gathered, along with community involvement information, will be used by the A&E to prepare site-specific work plans. These work plans will be used for project planning and subsequent removal contracting purposes.

At this stage, if the pre-design team identifies any structural deficiencies (e.g., inadequate venting, preexisting foundation damage), they will work with CIC to notify the residents or business owners.

3.2 Land Surveys

A land survey will be conducted for each property with contaminated soils. Land surveys will include topographic information for determining grades during restoration activities, and a property boundary survey to determine the limits of the property for which the removal is being conducted. The surveys will also include all physical and geographic features of the property (e.g., structures/buildings, trees, individual land use areas). The survey contractor will be a registered and licensed land surveyor in the State of Montana.

3.3 Site-Specific Work Plans

The A&E will prepare a site-specific work plan for each property to be used for planning, contracting, remediation, and restoration purposes. The work plans will be based on this RAWP and the overall site specifications, drawings, and DAR (CDM 2003a). Each site-specific work plan will include a RAWP Addendum and contract drawings for that property. Site-specific work plans will include property-specific background information on the inspection activities and sample analytical results. The contract drawings will depict the locations and volumes of LA asbestos-contaminated soil, insulation, and building materials requiring remedial action at the property. The design package will also include the pre-

design investigation inspection forms, which are to be used for informational purposes only. All contracting bids will be based on the site-specific work plans.

Unless otherwise noted, there will be voluntary preconstruction site walks at each property to allow the removal contractors to compare site-specific work plans with actual site conditions before submitting final bids. The site walk also provides the removal contractors with a forum to ask clarifying questions regarding the site-specific work plan. Site walks may result in changes to the site-specific work plan in the form of an amendment or revision. Site walks will be scheduled by the A&E, and representatives from the Volpe Center, removal contractors, and the A&E will attend.

Section 4
Community Involvement Coordination

The A&E is responsible for providing CIC services for remediation activities. CIC serves as a tenant's and/or property owner's initial point of contact for questions or concerns regarding remediation activities. Property owners and tenants (which can be a residential or a business occupant) are commonly referred to as *residents*.

The following sections describe CIC activities conducted before, during, and after remediation activities.

4.1 Pre-Remediation Activities

4.1.1 Field Review/ Relocation Meeting

CIC, in conjunction with the A&E design team, will review the draft site-specific work plan with the residents. Specific details and necessary changes to the draft site-specific work plan may be incorporated into the final site-specific work plan.

Before the meeting, A&E H&S will determine if it is necessary to relocate the resident. At the field review/relocation meeting, CIC explains the remediation process and any necessary relocation information to the tenant and/or property owner. The purpose of the relocation meeting is to discuss what government assistance, such as temporary housing options and reimbursable expenses, will be provided for residents who are relocated during remediation activities.

During the field review/relocation meeting, CIC will:

- Obtain necessary signature(s) from the owner(s) on the *Consent for Entry and Access to Property During Removal Activities* form

If the resident is being relocated, CIC will also:

- Educate residents about temporary relocation options
- Determine resident scheduling conflicts and communicate these to the Volpe Center
- Notify residents of when security is provided during remediation activities
- Gather necessary information to adequately meet resident needs
- Complete relocation and reimbursement documents and submit to the Volpe Center

4.1.2 Pre-Construction Site Walks

Unless otherwise noted, there will be pre-construction site walks at each property to allow the removal contractors to compare site-specific work plans with actual site conditions before submitting final bids. This may result in changes or revisions to the site-specific work plan, requiring CIC to communicate changes to or from the resident.

4.1.3 Site-Specific Work Plan Signing Meeting

Before remediation activities, CIC will conduct the site-specific work plan signing meeting with the residents. The purpose of the signing meeting is to ensure that the residents understand and agree with the remediation activities to be conducted at the property.

Once the site-specific work plan is signed, it is stamped "original" and copies are distributed to the residents. The signed original will be maintained by the A&E in the property file.

4.1.4 Task Order Award

The Volpe Center awards a task order to a removal contractor and subsequently submits the removal contractor's schedule to the A&E. When received by the A&E, CIC will contact every impacted resident with the scheduled dates of remediation activities as quickly as possible, in case there are significant scheduling problems.

A&E CIC will also verify relocation information with the resident. If the resident is to stay at a government-contracted lodging facility, CIC will make the necessary reservations on the residents' behalf after receiving approval from the government. Accommodations other than a government-contracted lodging facility are made directly by the resident.

Before remediation begins, CIC will collect any keys necessary for property access during the site activities. CIC will also review any pertinent reminders (e.g., firearm safety, mail delivery hold, instructions for feeding fish and plants) with the resident. Since residents are not allowed to return to a property once remediation activities have started, they are instructed to contact CIC regarding any issues that arise (e.g., emergency retrieval of items from the property).

4.2 Remediation Activities

4.2.1 Start of Remediation Activities

A&E oversight will hold a tailgate meeting, with the removal contractor's site supervisor and A&E CIC in attendance, to review site remediation activities and to ensure that the removal contractor and A&E oversight personnel have consistent and current site-specific work plans. The Volpe Center onsite representative and/or EPA onsite manager may also attend, if available.

CIC and A&E oversight will conduct a site walkthrough and thoroughly document the site's existing conditions including, but not limited to existing feature damage, existing structure material damage, operability of utility systems within designated work zones, and all interior and exterior areas.

A&E CIC also notifies nearby properties of remediation activities and provides a contact number for problems or questions.

4.2.2 During Remediation Activities

During the removal, CIC will maintain communication with the Volpe Center, the removal contractor, other A&E staff, and the resident. As directed, CIC is responsible for discussing any changes that arise to the site-specific work plan with the resident.

CIC will communicate with A&E oversight as needed to track the progress of work at each property. The frequency that CIC updates the resident varies, depending on each resident's individual needs and the circumstances of each property. CIC will also

communicate with the government-contracted lodging facilities to coordinate changes to reservations accordingly, after receiving approval from the government.

4.2.3 End of Remediation Activities

After remediation activities have been completed, but before a restoration final inspection, CIC and A&E oversight will conduct a site walkthrough and thoroughly document the site's conditions - similar to the inspection done when remediation activities began. The purpose is to document existing conditions upon return of property to the residents. It also proactively identifies any outstanding restoration issues that are the removal contractor's responsibility.

4.3 Post-Remediation Activities

4.3.1 Moving Resident Home

CIC will work together with the Volpe Center and removal contractor to determine the earliest possible point that the resident can safely move home. The resident will not be allowed to move home until the results of any clearance samples meet the clearance criteria established by EPA and all restoration work that could significantly impact the resident's health and safety is completed. Minor restoration work (e.g., landscaping and small repairs) may need to be completed after the resident moves home.

When directed, CIC will authorize the relocated resident to return home. At this time, CIC will return house keys, complete reimbursement claim forms, and if applicable, educate the resident on care of new hydroseed. CIC will also be responsible for sending the claim form and all receipts to the Volpe Center.

Once the resident has moved home, CIC will coordinate the resolution of any outstanding restoration issues with A&E restoration oversight. CIC will be available to respond as needed. The A&E will also schedule a meeting with the resident after they have moved home. At this meeting the A&E will issue the resident a HEPA vacuum and provide operation instructions.

4.3.2 Site-Specific Completion Form

After remediation activities have been completed, the A&E will prepare the site-specific completion form. This form summarizes remediation activities performed at the property and any known LA asbestos contamination remaining. When possible, CIC will conduct a meeting with the resident to review and sign the document. However, when a resident is unresponsive or refuses to sign, CIC will mail the form to the resident without signature. The signed original completion form will be maintained by the A&E in the property file.

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Section 5
Contaminated Soil Removal

The removal contractor will remove LA asbestos-contaminated soils from residential, commercial, and industrial properties in accordance with the removal and clearance criteria established by EPA. In general, soils will be removed if LA concentrations of investigation and/or characterization sample results meet or exceed the removal action level criteria as established by EPA. Additionally, visual inspections may be used to determine areas requiring removal. Details regarding action levels and clearance criteria for soil are found in the *Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum* (EPA 2003a) and its revisions. Action levels and clearance criteria are subject to revision by EPA.

The removal contractor will furnish all labor, supervision, materials, equipment, tools, permits, and incidentals necessary to perform all contaminated soil removal activities.

If it is determined by A&E H&S that the residents must be temporarily relocated during remediation activities, they will be required to leave their homes and/or property. Upon approval from the Volpe Center, the resident will be provided with temporary housing by the government. The government will be responsible for the cost of any approved relocation and will provide to the resident(s), the government's daily food allotment for the duration of their relocation.

Businesses may be closed during remediation activities. No costs for loss of business will be provided by EPA. However, relocation assistance may be provided upon approval by EPA.

Removal contractors are required to adhere to their submitted removal schedule to minimize the impact of the cleanup on the residents or businesses.

Because of the hazardous nature of the work, access to properties for residents or business owners will not be allowed until the results of the clearance samples meet the clearance criteria established by EPA and all restoration work that could significantly impact the resident's or business owner's health and safety is completed. Only under emergency situations will items be retrieved. Economic and time considerations for the property's residents or businesses will be considered when scheduling work.

EPA will provide HEPA vacuums to owners whose properties have undergone cleanups. The Volpe Center is responsible for procuring HEPA vacuums in accordance with the *HEPA Vacuum Program Memorandum* (Volpe Center 2003). The A&E is responsible for distributing HEPA vacuums in accordance with the memorandum.

5.1 Removal Contractor Documentation

Removal contractors are responsible for submitting to the Volpe Center, as part of their SSHASP, a Designation of Competent Person Form (Form L of the CSHASP's Appendix A), which designates a competent person for each work safety category listed.

The removal contractor's SHSO and competent person is each responsible for providing regular and frequent inspections of removal property activities, including site preparation, removal, and restoration activities, to ensure that appropriate precautions are implemented to protect public and worker safety. These inspections are to be documented by both the SHSO and competent person and made available to the Volpe Center at the biweekly H&S meetings. The biweekly H&S meetings will be conducted by A&E H&S with the Volpe Center Site Manager, removal contractor SHSO, and A&E H&S in attendance.

In addition, the removal contractor is responsible for completing an Activity Hazard Analysis (AHA) Form (Form G of the CSHASP's Appendix A) for each removal property, and updating the AHA throughout the different phases of removal/restoration. The AHA Form will be submitted by the removal contractor to A&E H&S for review before the start of a site's removal work, and must be posted at the site throughout project activities. All AHA forms must be submitted to A&E H&S by the removal contractor's SHSO upon property completion.

5.2 Subcontractor Activities

The removal contractor is responsible for any project work performed by its subcontractors, including pre-worksite, site preparation, site removal, and site restoration activities. The removal contractor is responsible for ensuring that its subcontractors adhere to all applicable federal, state, and project requirements and guidance documents, including the CSHASP, removal contractor SSHASP, RAWP, and site-specific work plans.

5.3 Pre-Worksite Activities

Before arriving at the site, the removal contractor is responsible for:

- Notifying local utility companies or private companies to identify and mark any utility lines within the designated work areas, in accordance with OSHA Standard 29 Code of Federal Regulations (CFR) 1926.651(b)(1).

Before beginning any site preparation or excavation, the removal contractor is responsible for:

- Verifying the location of underground utilities or installations, in accordance with OSHA Standard 29 CFR 1926.651(b)(2). The removal contractor assumes full responsibility for damage to existing utility features. These will include, but are not limited to, sewer/septic lines, drain fields, telephone/cable lines, gas and water lines, electrical connections, and irrigation systems.

Before beginning any site preparation activities, the removal contractor and A&E are each responsible for:

- Conducting a site walkthrough and thoroughly documenting the site's existing conditions including, but not limited to, existing feature damage, existing structure material damage, operability of utility systems within designated work zones, equipment pathways and placement areas, changes in conditions that could result in

the presence of LA asbestos after prior investigations were completed, and an inspection of all interior and exterior areas.

Appropriate levels of respiratory protection for project-related activities are provided in Section 7 of the CSHASP. Removal contractors are also required to provide a PPE training program for personnel within their SSHASPs.

5.4 Site Preparation

A&E oversight will hold a tailgate meeting on the first day of site setup, with the removal contractor site supervisor and A&E CIC in attendance, to review site remediation activities and to ensure that the removal contractor and A&E oversight personnel have consistent and current site-specific work plans. Additionally, imminent hazards identified will be evaluated by A&E oversight and the removal contractor site supervisor to determine if corrective actions are necessary.

The removal contractor is responsible for the following:

- Implementing safety precautions, including use of appropriate PPE, if contaminated materials are expected to be disturbed.
- Using appropriate engineering controls to prevent contaminant migration as a result of remediation activities.
- Implementing and maintaining dust control throughout the duration of site activities, from site preparation through restoration, in accordance with Montana Code Annotated (MCA) Title 75 (Environmental Protection), Administrative Rules of Montana (ARM) Title 17, and National Emissions Standards for Hazardous Air Pollutants (NESHAPs) asbestos regulations (40 CFR Part 61).
- Ensuring that all vacuums used on the project have HEPA filters that meet the definition as stated in OSHA Standards 29 CFR 1926.1101(b). The removal contractor will provide HEPA filter documentation to A&E H&S for each manufacturer's model of vacuum. The removal contractor will document the regular maintenance (e.g., changing of HEPA filters) performed on all vacuums, making this documentation available to A&E H&S upon request.
- Maintaining a copy of contract documents, including the site-specific work plan and SSHASP, at each work site throughout setup, removal, and restoration activities.
- Providing temporary electric power and potable water for the duration of site activities.
- Ensuring electrical safety throughout the duration of site activities as required in Section 4.5.7 of the CSHASP and all applicable OSHA Standards, including 29 CFR 1926.400 Subpart K. All activities with the potential to be performed within 10 feet of energized overhead electrical lines must be evaluated as part of the site AHA by the removal contractor, and appropriate precautions must be implemented before remediation work may begin.
- Ensuring that all appropriate lockout/tagout (LO/TO) procedures, in accordance with project and OSHA requirements, including OSHA Standards 29 CFR 1926.416 and 29

CFR 1926.417, are implemented for any necessary shutdowns of a structure's electrical sources throughout the duration of site activities.

- Ensuring that only licensed electricians perform electrical repair work at a site.
- Ensuring that only licensed electricians perform disconnections and reconnections of all electrical circuits.
- Ensuring that only licensed plumbers perform plumbing repair work at a site.
- Ensuring that only licensed personnel perform repair work on gas, propane, or oil lines at a site.
- Identifying and posting residential traffic and pedestrian points of hazard with legible traffic signs, in accordance with OSHA Standard 29 CFR 1926.200(g)(1), throughout the duration of removal and restoration activities.
- Providing site traffic signage in compliance with DOT regulations, including, but not limited to, temporary stop signs when necessary.
- Identifying and evaluating any existing residential mechanical equipment within the work zones, isolating or removing any potential hazards.
- Placing/Staging removal equipment such as, but not limited to, loaders, excavators, decontamination trailers, and water storage tanks in a manner that minimizes inconvenience and risk to the public.
- Removing all nonpermanent matting or flooring from heavy equipment before its use in exclusion zones. This will assist with proper decontamination procedures.
- Keeping all sidewalks and other public access pathways free of equipment during nonwork hours, or providing a sufficiently permanent barrier to prevent pedestrian or vehicle access. Blocked pedestrian or vehicle access pathways will require rerouting by the removal contractor, in accordance with OSHA Standard 29 CFR 1926.200(g)(2).
- Securing sites to prevent children and pets from accessing work areas, during work and nonwork hours.
- Demarcating exclusion zone boundaries with orange fencing and/or red asbestos tape, based on the size and type of removal activities to be performed, and posting ingress/egress points with appropriate asbestos and PPE signage, in accordance with OSHA Standard 29 CFR 1926.1101(k)(7)(i). All removal activities will be conducted within an appropriately designed exclusion zone. The exclusion zone boundaries may only be removed when final clearance criteria are met.
- Demarcating support zone boundaries with orange fencing and yellow caution tape.
- Demarcating waste load out, personnel, and equipment pathways as part of the exclusion zone.

- Protecting all areas of the property where work activities are performed from inclement weather by implementing any reasonable safeguards necessary during removal and restoration activities.
- Ensuring that power is supplied to any refrigerators, freezers, or other items identified in the site-specific work plan or by the A&E.
- Providing fire extinguishers, in accordance with OSHA Standard 29 CFR 1926.150(c)(1)(VI), throughout the site's work areas including, but not limited to, the exclusion zone and decontamination facility.
- Repairing or replacing in kind all items damaged during remediation activities.
- Ensuring that skid-mounted sheds and other movable support structures located in areas identified for excavation are washed where in contact with contaminated soil, relocated to a noncontaminated area, and returned to their former location after restoration is complete.
- Moving automobiles, trailers, campers, or other similar items, if necessary, before cleanup activities, but only after the appropriate owner's permission is granted. These items will be returned to their original location by the removal contractor after restoration activities are complete.
- Adhering to all transportation and disposal requirements stated within the RAWP, including Section 16 of the Construction Specifications (Appendix A). All asbestos-containing material (ACM) generated during removal activities, with the exception of soil, will be disposed of at the Landfill. No polyethylene sheeting or PPE of any kind is to be disposed of at the mine site repository.
- Developing a handling plan for the collection, storage, transportation, and disposal of liquid waste generated at remediation properties.
- Implementing pollution control measures throughout all site activities.

The removal contractor will be responsible for maintaining these aspects of site preparation, and all appropriate safety precautions, throughout the duration of removal and restoration activities.

5.4.1 Protection of Existing Features

The removal contractor will protect existing utilities, structures, outbuildings, foundations, and improvements (i.e., selected trees, sidewalks, driveways, and other items) during all work phases at the site.

All soil removal work around foundations will be performed so that a 1:1 slope away from the foundation is maintained at all times.

Any onsite propane tanks interfering with soil removal or restoration work will need to be moved. The removal contractor is responsible for contacting the proper utility company, arranging for the move, and ensuring that its placement following excavation is performed by a licensed and qualified fitter in accordance with local utility codes.

5.4.2 Containment Setup

The removal contractor will construct an exclusion zone inside the designated work area to ensure the health and safety of the workers and public. A&E H&S will evaluate the exclusion zone construction during the H&S inspection (Section 5.4.5), and must approve of the final design. Exclusion zone boundaries will be demarcated with orange fencing and/or red asbestos tape, based on the size and type of removal activities to be performed, and removal contractor needs. The exclusion zone will encompass the entire contaminated area, including selected noncontaminated areas adjacent to the excavation area. These noncontaminated areas will be used as a contamination reduction zone (CRZ) for personnel and heavy equipment ingress/egress, and for staging of waste bags and other necessary equipment. In some circumstances, the exclusion zone may be moved (i.e., sliding exclusion zone) during a cleanup activity to facilitate the cleanup. No adjustment to the exclusion zone will occur without the prior approval of A&E H&S or oversight personnel.

The removal contractor is responsible for inspecting and maintaining the designated containment areas to ensure they are of sound construction and functioning as designed until final clearance criteria are achieved.

Asbestos warning and PPE requirement signs, in accordance with OSHA Standard 29 CFR 1926.1101(k)(7)(ii)(b), will be posted by the removal contractor at all ingress and egress points of the exclusion zone so that site personnel may read the signs and be aware of necessary protective steps before entering the exclusion zone. The signs will also serve to warn the public of the exclusion zone's dangers.

All contaminated material load out and storage areas are considered extensions of the exclusion zone. They must be fully demarcated and lined with polyethylene sheeting to ensure that clean areas adjacent to the exclusion zone are not cross-contaminated. The removal contractor will ensure that each haul truck's windows are up, drivers remain in the cab, and air conditioning units are off when inside the extension of the exclusion zone.

The removal contractor will provide adequate lighting within the work areas, in accordance with OSHA Standard 29 CFR 1926.56(b).

The removal contractor will address any potential fall hazards within the work areas, in accordance with OSHA Standard 29 CFR 1926.501.

The removal contractor is responsible for ensuring that all appropriate ACM handling procedures are implemented and in accordance with OSHA Standard 29 CFR 1926.1101(l)(2).

Once the exclusion zone has been approved by A&E H&S, all personnel entering the exclusion zone must wear the appropriate Level C PPE for their assigned task. Removal contractors are required to provide a PPE training program for personnel within their SSHASPs. Section 7 of the CSHASP provides a review of task-based project PPE requirements.

5.4.3 Personnel Decontamination

The removal contractor will establish a properly demarcated, HEPA-filtered, 3-stage decontamination trailer or equivalent, hereafter referred to as a facility, consisting of an equipment room (dirty room), shower area, and a clean room for personnel

decontamination, in accordance with OSHA Standard 29 CFR 1926.1101(g). Personnel decontamination procedures must be posted in the clean and dirty rooms so that personnel may read and take necessary steps to ensure their safety. The removal contractor must perform regular housekeeping duties within all decontamination facility rooms to ensure and maintain their cleanliness. Documentation of such housekeeping will be posted in the clean room of the decontamination facility and made available to A&E H&S upon request.

The removal contractor is responsible for maintaining a 3-stage decontamination facility onsite until clearance results meet removal clearance criteria.

The removal contractor will use potable water for all personnel decontamination, in accordance with OSHA Standard 29 CFR 1910.141(b)(1)(i). All potable water delivery systems must be disinfected on a regular schedule, with greater frequency during the summer months. The removal contractor must submit to the Volpe Center a schedule for disinfection of its potable water systems. Documentation of potable water equipment inspections and disinfections must be maintained by the removal contractor, made visible to personnel using a particular water source, and provided to A&E H&S upon request. Wastewater generated from personnel decontamination must be disposed of at the Landfill, or passed through a 20- and 5-micron filter and disposed of as sanitary waste. The removal contractor shall set up one decontamination facility for each property or group of properties if the properties are contiguous.

Upon approval from A&E H&S, if removal activities are expected to last for less than one-half of a work day (i.e., less than 4 hours), the removal contractor may perform small-scale, short-duration removals in Modified Level C and without a 3-stage decontamination facility at the site. If permission is granted for Modified Level C PPE (defined in Section 7 of the CSHASP), the removal contractor must maintain a suitable means onsite, approved by A&E H&S, for PPE, equipment, and personnel decontamination. This means of decontamination will be maintained onsite by the removal contractor until clearance results meet removal clearance criteria.

Specific requirements regarding the decontamination process for both personnel and equipment are to be presented in the removal contractor's SSHASP.

5.4.4 Equipment Decontamination

The removal contractor is responsible for implementing heavy equipment decontamination procedures when transporting equipment from site to site, and when equipment is removed from the project.

If a full-size decontamination pad is available at the site, heavy equipment will be rinsed off with water to remove all exterior contamination before transport. The removal contractor shall ensure that all appropriate controls of decontamination water are implemented to prevent releases of material outside of the exclusion zone.

At most sites, it is not feasible to install a full-size decontamination pad. In these cases, the removal contractor must use the following alternative measures, singly or in combination, to ensure worker safety and public protection during all contaminated equipment transportation. These measures must be taken before any final clearance sampling.

Once gross material has been removed, collected, and disposed of properly:

- The removal contractor may spray off exterior contamination into the excavated hole or capture it on polyethylene sheeting, before transporting equipment off site.
- The removal contractor may wrap contaminated areas of the heavy equipment with polyethylene sheeting and duct tape to prevent material release during transport.

In addition, removal contractors are responsible for ensuring that all haul truck and haul vehicle exteriors are protected during loading with polyethylene sheeting and decontaminated, as necessary, before leaving the exclusion zone, including extensions of the exclusion zone.

All heavy equipment must undergo a full interior and exterior decontamination by the removal contractor before being taken off use from the project. The removal contractor will remove, replace, and dispose.of any air filters at the Landfill as ACM. A&E H&S must be notified by the removal contractor before any heavy equipment is removed from project service and when its decontamination is completed. A&E H&S reserves the right to verify the decontamination of the heavy equipment by the removal contractor.

Equipment Pathways

Equipment pathway controls will be implemented. That is, the paths the equipment will traverse during the work will be controlled. These controls are designed to minimize contamination of equipment during soil load-out. These controls will consist of, but are not limited to, covering driving pathways within excavations and covering truck dump boxes with 6-mil thick polyethylene sheeting to prevent cross-contamination during contaminated soil load-out.

Any material used as a haul pathway, such as plywood or plastic sections, will require prior approval from A&E H&S. The removal contractor is responsible for a complete decontamination of any such approved haul pathway material, if reusable, before it leaves the exclusion zone and before final clearance sampling. In addition, any reusable haul pathway material used outside of the exclusion zone will be inspected by the removal contractor for contamination before its transport offsite. Material observed to be contaminated will be washed off in the site's exclusion zone, if before final clearance sampling, or decontaminated or disposed of at the mine site repository or Landfill. Material observed to be contaminated will be handled as ACM during transport from the site. If the haul pathway material is observed by the removal contractor's competent person, removal contractor's SHSO, A&E oversight, or A&E H&S to be sufficiently deteriorated so as to prevent proper decontamination, the removal contractor will dispose of it as ACM at the Landfill.

Equipment Transport

All transport of heavy equipment by the removal contractor will be performed in accordance with all applicable DOT regulations.

A&E H&S reserves the right to inspect all removal contractor equipment decontamination and transport procedures for adherence to the preceding protocol.

5.4.5 H&S Inspection

The removal contractor's SHSO will be responsible for inspecting all aspects of a site's setup before an inspection by A&E H&S. The removal contractor's SHSO will notify A&E H&S when a site's setup is ready for inspection and an AHA Form has been completed. A&E H&S will then perform a site containment inspection to ensure compliance with applicable project and OSHA regulations. Removal work may not begin until a site's setup is approved by A&E H&S.

5.4.6 Trees, Shrubs, and Other Debris

Any vegetation (e.g., trees, shrubs) to be removed will be identified in the site-specific work plan and will be disposed of at an approved site (e.g., mine site repository). Tree and shrub removal will be performed as defined in the site-specific work plan. Chain sawing operations are a recognized safety hazard and are to be performed in accordance with OSHA Standard 29 CFR 1910.266(e)(2).

Yard debris to be removed will be included in the site-specific work plan and will be disposed of at an approved site.

The removal contractor will assess all tree cutting and removal as part of the site AHA, which will be submitted to and reviewed by A&E H&S before the start of site work. The removal contractor will ensure that all personnel performing tree removal activities are adequately trained and equipped to perform the task in a safe manner.

The removal contractor will hand dig within a tree's drip line. The removal contractor will be responsible for covering exposed tree roots within a cleared (i.e., soil clearance results meet clearance criteria) excavated area with a minimum of 4 inches of government-approved topsoil. Any vermiculite that is still visible around tree roots after excavation will also be covered with a minimum of 4 inches of topsoil. In addition, the covered areas will be watered by the removal contractor on a regular and sufficient basis.

5.4.7 Concrete, Decks, and Other Items

Items located in yards such as concrete, decks, fencing, and other site improvements that require demolition to access contaminated soils will be identified in the site-specific work plan. The items to be demolished will be disassembled, cut, uprooted, or otherwise removed using the appropriate equipment and procedures. Any general construction debris not considered to be contaminated will be transported to the Lincoln County Landfill. Contaminated items and construction debris will be handled as ACM and properly disposed of at the Landfill or mine site repository. A&E oversight or H&S will decide whether the items and construction debris are to be handled as ACM before any demolition work.

The following items will be removed as indicated:

- **Pavement**: Bituminous pavement, asphalt, and/or concrete to be removed will be demolished using a walk-behind concrete saw, or cutoff saw (as required), with appropriate dust suppression measures taken. Items that are removed will be considered contaminated and will be properly disposed. The removal contractor will

perform all cutting activities in accordance with all applicable project CSHASP, SSHASP, and OHSA requirements, including OSHA Standard 29 CFR 1926.702(i)(1)-(2).

- Piping: If necessary, underground piping that interferes with soil removal, such as sprinklers, storm drains, water lines, or sewer/septic lines will be cut with hacksaws or appropriately sized electric- or gasoline-powered saws. Any sewer piping or miscellaneous debris to be removed will be excavated using an appropriate sized hydraulic excavator and disposed of at the Landfill or mine site repository.

The removal contractor will be responsible for ensuring that hazardous and nonhazardous materials are handled appropriately and segregated for disposal.

All items not scheduled to be demolished will be protected during the removal phase. Safe work practices will be employed by all personnel to prevent mishaps to remaining structures, other items, or personnel. The removal contractor will review the site-specific work plan for specific safety requirements.

5.4.8 Cleaning of Yard Items

The removal contractor will HEPA vacuum and/or wet wipe as necessary loose items, such as, but not limited to, yard ornaments, bicycles, and outdoor grills, that are in contact with contaminated soil and located within the established exclusion zone. Items will then be moved to another uncontaminated part of the yard or storage area; stored in a Connex-type temporary storage box; given to the home or business owner for safekeeping; or disposed of by the removal contractor in accordance with the site-specific work plan. For stacked items such as lumber and firewood, the layer in contact with the contaminated soil will be cleaned or disposed of by the removal contractor in accordance with the site-specific work plan.

5.4.9 Stumps

Stumps are to be removed as specified in the site-specific work plans. If stump removal is necessary, it will be performed after final clearance is achieved and after the initial 6-inch lift of backfill is placed.

Removal contractors are responsible for ensuring that all applicable safety precautions are taken during stump removal.

5.5 Soil Excavation

5.5.1 Contaminated Soil Removal

The removal contractor will be responsible for selecting the appropriate equipment for conducting the excavation based on the site-specific work plan. The equipment may include an appropriate sized hydraulic excavator, a vacuum truck, hand tools, and dust control equipment, depending on the size and complexity of the removal. All necessary soil within the exclusion zone will be excavated according to site-specific work plan requirements and clearance criteria.

All excavations, embankments, stockpiles, haul roads, permanent and temporary access roads, waste staging and storage areas, stabilization materials handling areas, and other

work areas may cause a dust hazard. Adequate dust suppression must be maintained throughout the duration of all removal contractor site activities, including restoration. Visible dust emissions, whether onsite or leaving the site, are strictly prohibited. The removal contractor is solely responsible for complying with the project's dust suppression requirements.

The usage of water, generally via water hoses and water trucks, will be the primary method of dust suppression. Additional methods include, but are not limited to, covering haul pathways with gravel, and working methodically and with care when handling soil.

If there is no water source available, adequate, and ready at the site for dust suppression, the removal contractor is not permitted to perform excavation or soil handling of any kind.

The removal contractor will maintain a 1:1 slope away from existing foundations.

Following the excavation of contaminated soils within the exclusion zone, A&E oversight will inspect the sidewalls and bottom of the excavation. If there is vermiculite in large quantities still visible in the excavation, the removal contractor will be directed to remove an additional 6 inches of contaminated soil until, in the judgment of A&E oversight personnel, the remaining soils are expected to meet soil clearance criteria or the excavation extends to 3 feet below ground surface (bgs), which is the maximum project excavation depth.

When the soil remaining in the excavation area is expected to meet soil clearance criteria, A&E oversight will collect confirmation soil samples in accordance with the SAP (CDM 2008c) and the following Section 5.5.4. If the sample results indicate that the remaining soils comply with the clearance criteria, the excavation will be considered complete. If the sample results indicate that clearance criteria are not met within the excavation, the removal contractor will be directed to excavate an additional 6 inches bgs until soil clearance criteria are expected to be met or the maximum excavation depth of 3 feet bgs is reached.

This iterative process will continue until the sample results indicate that soil clearance criteria have been met.

If contamination is still visible at 3 feet bgs, the removal contractor will stop excavating and place orange safety fencing in the bottom of the excavation. Contamination deeper than 3 feet bgs will only be excavated under special circumstances and only with approval of EPA.

Excavation depths which differ from those stated in the site-specific work plans will be documented by A&E oversight and communicated to property owners via a Property Closeout Checklist.

Any remaining soil stockpiles at the end of the work day will be covered to prevent dust and contamination migration out of the site's exclusion zone. All such stockpiles must be authorized by A&E H&S or oversight.

Any changes to excavation quantities stated in the site-specific work plans will be discussed with the Volpe Center Site Manager before excavation.

5.5.2 Soil Removal from Crawl Spaces

All contaminated material removal to be performed in crawl spaces will be evaluated on a site-by-site basis. Details for removal will be included in the site-specific work plans. Soil removal from crawl spaces will be done in accordance with the site-specific work plans and will require approval of A&E H&S and the Volpe Center onsite representative.

The removal contractor will be responsible for protecting and maintaining the integrity of all foundation and support system features within crawl spaces.

5.5.3 Application of Concrete or Shotcrete

The removal contractor may be required to apply concrete or shotcrete as a means of encapsulating remaining LA asbestos contamination within soils that are difficult to access. Such applications will require prior approval of the Volpe Center and will be indicated in the site-specific work plans. Sections 7 and 17 of the Construction Specifications (Appendix A) contain additional information pertaining to concrete and shotcrete application.

5.5.4 Confirmation Soil Sampling

Confirmation soil sampling may be performed simultaneously with the excavation of contaminated soils. That is, if the excavation is large enough, confirmation samples may be collected in areas of the excavation that are completed, while the removal contractor completes excavation in other areas. If confirmation sampling is performed simultaneously with the excavating activity and areas of the excavation are deemed complete, the removal contractor is responsible for ensuring that that there is no cross-contamination. Confirmation sampling will be conducted in accordance with the SAP (CDM 2008c).

The A&E is responsible for collection and analysis of confirmation soil sampling.

Details regarding action levels and clearance criteria are found in the EPA *Action Level and Clearance Criteria Technical Memorandum, Libby Asbestos Site* (EPA 2003a) and its revisions. Action levels and clearance criteria are subject to revision by EPA.

5.5.5 Transportation and Disposal

Contaminated material will be excavated and live-loaded into trucks or trailers directly at the property, with care taken to prevent contamination of the trucks. Polyethylene sheeting will be placed over the side of the truck or trailer bed to prevent any contaminated material from spilling on the truck. The utmost care will be given during loading to ensure that the truck or trailer exterior remains clean; however, trucks or trailers will be cleaned with water should the decontamination be warranted.

Truck and trailer beds should be sealed watertight. Any damaged or inadequately sealed beds observed by the removal contractor's competent person, removal contractor's SHSO, A&E oversight, or A&E H&S will be immediately removed from service until the necessary repairs or corrections are made.

Trucks cabs will be equipped with positive air pressure HEPA filter systems. The removal contractor will ensure that all operators are fully trained in usage of the air filtration systems. All positive pressure units used by the removal contractor must have an identification number. The removal contractor will supply this identification number to A&E H&S prior to its use on the project.

Controlled pathways will be constructed over uncontaminated property areas so that trucks or trailers can be driven to the area(s) requiring excavation with minimal disruption to the existing vegetation. Controlled pathways and materials will adhere to the requirements set forth in Section 5.4.4.

Before departing the property, trucks and trailers will have tarps secured over the beds. Any damaged or inadequate tarps observed by the removal contractor's SHSO, removal contractor's competent person, A&E oversight, or A&E H&S will be immediately removed from service until the necessary repairs or corrections are made.

Contaminated soils will be disposed of at the mine site repository. All ACM other than contaminated soils will be disposed of at the Landfill.

The removal contractor will ensure that all haul trucks used to transport contaminated material undergo annual DOT certification inspections. Copies of the inspection reports will be submitted to A&E H&S before the truck is used on the project.

5.5.6 Control of Surface Water

Responsibility for the care of surface water will be borne by the removal contractor until completion of restoration work. The removal contractor will provide the materials, equipment, and personnel needed to control surface water and to protect the cleanup work from damage by water. Using temporary control measures, the removal contractor will be responsible for preventing surface water from running into and out of the exclusion zones.

If necessary, portable pumps will be used to remove any ponded water. Any water removed from an excavation will be treated as contaminated fluids and disposed of at the mine site repository or Landfill.

5.5.7 Pollution Prevention

Material will not be allowed to enter and pollute any surface water or groundwater in the project area. Vehicles and equipment will be lubricated or fueled in a controlled manner. All removal contractor personnel and subcontractors will comply with applicable federal, state, and local laws concerning pollution of surface and groundwater. Special measures, with approval from EPA, may be implemented to prevent chemicals, fuels, oils, greases, and other materials from entering public waters.

5.6 Air Sampling During Contaminated Soil Removal

5.6.1 Stationary Air Sampling

During contaminated soil removal, the perimeter of the exclusion zone will be monitored for asbestos structure migration by collecting a stationary air sample from the downwind

direction at the exclusion zone boundary. All stationary sampling will be conducted in accordance with the SAP (CDM 2008c).

The A&E is responsible for collection and analysis of stationary sampling.

If more than 2 LA structures are detected on a perimeter air sample, site-specific engineering controls and work practices will be reviewed by the Volpe Center Site Manager, A&E H&S, removal contractor SHSO, and removal contractor competent person. The removal contractor is responsible for implementing any necessary corrective actions in a timely manner.

5.6.2 Personal Breathing Zone Air Sampling

The A&E will collect and analyze task-based personal breathing zone (BZ) air samples on removal contractor personnel conducting contaminated soil removal to document that the level of respiratory protection is adequate for the task being conducted. All personal BZ sampling will be conducted in accordance with the SAP (CDM 2008c). Sampling frequencies for personal BZ air monitoring were established using task-based personal BZ sampling data collected during the 2002 - 2006 Libby Project field seasons. Personal BZ air sampling will consist of collecting one time weighted average (TWA) sample and one short-term exposure limit (STEL) (i.e., one 30-minute excursion) sample per task a minimum of every 6 months. Sampling frequencies are defined in A&E Air Monitoring Frequencies provided in Appendix B, and are adjusted as necessary.

If personal BZ samples are reported above the respective permissible exposure limit for the appropriate sample, the sample will be confirmed by transmission electron microscopy (TEM) as specified in the SAP (CDM 2008c). If the result is confirmed by TEM, the Volpe Center, A&E H&S, and removal contractor will assess work practices, evaluate contributing factors, and modify engineering controls as necessary.

The A&E will supply BZ sample results to the removal contractor to satisfy OSHA requirements. The removal contractor is responsible for posting these results in a location readily available to its employees.

5.7 Security

For removal properties requiring relocation of the residents, the government will supply a qualified security contractor to provide security whenever the removal contractor is not onsite. The removal contractor will coordinate with the A&E to ensure that proper security is being provided during the time the resident is relocated from their property. The level of security may vary from periodic patrols to onsite full-time based on the location of the property and whether it is adjacent or close to other properties being remediated. This will be evaluated and determined by the Volpe Center.

The removal contractor is responsible for site security during regular working hours (when the government-provided security contractor is not onsite).

Section 6
Vermiculite-Containing Insulation Removal

The removal contractor shall remove VCI from residential, commercial, and industrial properties in accordance with the removal and clearance criteria established by EPA. VCI will either be removed or left in place at a property based on EPA removal criteria. If the insulation may be accessed and disturbed under normal conditions, such as in attics, it will generally be removed. If the insulation is well contained and will not be disturbed under normal conditions, such as in walls, it will generally be left in place. If left in place and VCI is present in that particular area, any openings through which the insulation may enter the living space, such as electrical outlets or light fixtures, will be sealed off to prevent exposure. Details regarding action levels and clearance criteria are found in the *Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum* (EPA 2003a) and its revisions. Action levels and clearance criteria are subject to revision by EPA.

The removal contractor will furnish all labor, supervision, materials, equipment, tools, permits, and incidentals necessary to perform all VCI removal activities.

If a resident or business owner represents to EPA that they will remodel a portion or all of a structure immediately following a removal, and have specific plans in place to do so, EPA may decide to remove VCI from certain areas of the structure to be remodeled. VCI will only be removed from those areas impacted by the remodeling and no restoration will be performed (e.g., walls will be removed down to the studs, cleaned, cleared, and reinsulated, and the owner will then complete the remodeling, including the replacement of the wall sheathing material).

If it is determined by A&E H&S that the residents must be temporarily relocated during remediation activities, they will be required to leave their homes and/or property. Upon approval from the Volpe Center, the resident will be provided with temporary housing by the government. The government will be responsible for the cost of any approved relocation and will provide to the resident(s) the government's daily food allotment for the duration of their relocation.

Businesses may be closed during remediation activities. No costs for loss of business will be provided by EPA. However, relocation assistance may be provided upon approval by EPA.

Removal contractors are required to adhere to their submitted removal schedule to minimize the impact of the cleanup on the residents or businesses.

Due to the hazardous nature of the work, access to properties for residents or business owners will not be allowed until the results of the clearance samples meet the clearance criteria established by EPA and all restoration work that could significantly impact the resident's or business owner's health and safety is completed. Only under emergency situations will items be retrieved. Economic and time considerations for the property's residents or businesses will be considered when scheduling work.

EPA will provide HEPA vacuums to owners whose properties have undergone cleanups. The Volpe Center is responsible for procuring HEPA vacuums in accordance with the *HEPA Vacuum Program Memorandum* (Volpe Center 2003). The A&E is responsible for distributing HEPA vacuums in accordance with the memorandum.

6.1 Removal Contractor Documentation

Removal contractors are responsible for submitting to the Volpe Center, as part of their SSHASP, a Designation of Competent Person Form (Form L of the CSHASP's Appendix A) which designates a competent person for each work safety category listed.

The removal contractor's SHSO and competent person is each responsible for providing regular and frequent inspections of removal property activities, including site preparation, removal, and restoration activities, to ensure that appropriate precautions are implemented to protect public and worker safety. These inspections are to be documented by both the SHSO and competent person and made available to the Volpe Center at the biweekly H&S meetings. The biweekly H&S meetings will be conducted by A&E H&S, with the Volpe Center Site Manager, removal contractor SHSO, and A&E H&S in attendance.

In addition, the removal contractor is responsible for completing an AHA Form (Form G of the CSHASP's Appendix A) for each removal property and updating the AHA throughout the different phases of removal/restoration. The AHA Form will be submitted by the removal contractor to A&E H&S for review before the start of a site's removal work, and must be posted at the site throughout project activities. All AHA forms must be submitted to A&E H&S by the removal contractor's SHSO upon property completion.

6.2 Subcontractor Activities

The removal contractor is responsible for any project work performed by its subcontractors, including pre-worksite, site preparation, site removal, and site restoration activities. The removal contractor is responsible for ensuring that its subcontractors adhere to all applicable federal, state, and project requirements and guidance documents, including the CSHASP, removal contractor SSHASP, RAWP, and site-specific work plans.

6.3 Pre-Worksite Activities

Before beginning any site preparation activities, the removal contractor and A&E are each responsible for:

- Conducting a site walkthrough and thoroughly documenting the site's existing conditions, including but not limited to: existing feature damage, existing structure material damage, operability of utility systems within designated work zones, equipment pathways and placement areas, changes in conditions that could result in the presence of LA asbestos after prior investigations were completed, and an inspection of all interior and exterior areas.

Appropriate levels of respiratory protection for project-related activities are provided in Section 7 of the CSHASP. Removal contractors are also required to provide a PPE training program for personnel within their SSHASPs.

6.4 Site Preparation

A&E oversight will hold a tailgate meeting on the first day of site setup, with the removal contractor site supervisor and A&E CIC in attendance, to review site remediation activities and to ensure that the removal contractor and A&E oversight personnel have consistent and current site-specific work plans. Additionally, imminent hazards identified will be evaluated by A&E oversight and the removal contractor site supervisor to determine if corrective actions are necessary.

The removal contractor is responsible for the following:

- Implementing safety precautions, including use of appropriate PPE, if contaminated materials are expected to be disturbed.
- Using appropriate engineering controls to prevent contaminant migration as a result of remediation activities.
- Implementing and maintaining dust control throughout the duration of site activities, from site preparation through restoration, in accordance with MCA Title 75 (Environmental Protection), ARM Title 17, and NESHAPs asbestos regulations (40 CFR Part 61).
- Ensuring that all vacuums used on the project have HEPA filters that meet the definition as stated in OSHA Standard 29 CFR 1926.1101(b). The removal contractor will provide HEPA filter documentation to A&E H&S for each manufacturer's model of vacuum. The removal contractor will document the regular maintenance (e.g., changing of HEPA filters) performed on all vacuums, making this documentation available to A&E H&S upon request.
- Maintaining a copy of contract documents, including the site-specific work plan and SSHASP, at each work site throughout setup, removal, and restoration activities.
- Ensuring that all attic accesses are of adequate size (i.e., a minimum of 18 inches by 18 inches) for personnel and equipment ingress/egress.
- Providing temporary electric power and potable water for the duration of site activities.
- Ensuring that all appropriate LO/TO procedures, in accordance with project and OSHA requirements, including OSHA Standards 29 CFR 1926.416 and 29 CFR 1926.417, are implemented for a structure's electrical sources throughout the duration of site activities.
- Ensuring electrical safety throughout the duration of site activities as required in Section 4.5.7 of the CSHASP and all applicable OSHA Standards, including 29 CFR 1926 Subpart K. All activities with the potential to be performed within 10 feet of energized overhead electrical lines must be evaluated as part of the site AHA by the removal contractor, and appropriate precautions must be implemented before remediation work may begin.
- Ensuring that only licensed electricians perform electrical repair work at a site.

- Ensuring that only licensed electricians perform disconnections and reconnections of all electrical circuits.
- Ensuring that only licensed plumbers perform plumbing repair work at a site.
- Ensuring that only licensed personnel perform repair work on gas, propane, or oil lines at a site.
- Identifying and posting residential traffic and pedestrian points of hazard with legible traffic signs, in accordance with OSHA Standard 29 CFR 1926.200(g)(1), throughout the duration of removal and restoration activities.
- Providing site signage in compliance with DOT regulations, including temporary stop signs when necessary.
- Identifying and evaluating any existing residential mechanical equipment within the work zones, isolating or removing any potential hazards.
- Placing/Staging removal equipment such as, but not limited to, vacuum machines, vacuum boxes, decontamination trailers, and water storage tanks in a manner that minimizes inconvenience and risk to the public.
- Keeping all sidewalks and other public access pathways free of equipment during nonwork hours, or providing a sufficiently permanent barrier to prevent pedestrian or vehicle access. Blocked pedestrian or vehicle access pathways will require rerouting by the removal contractor in accordance with OSHA Standard 29 CFR 1926.200(g)(2).
- Securing sites to prevent children and pets from accessing work areas during work and nonwork hours.
- Demarcating exclusion zone boundaries and posting ingress/egress points with appropriate asbestos and PPE signage, in accordance with OSHA Standard 29 CFR 1926.1101(k)(7)(i). All removal activities will be conducted within an appropriately designed exclusion zone. The exclusion zone boundaries may only be removed when final clearance criteria are met.
- Demarcating support zone boundaries with orange fencing and yellow caution tape.
- Demarcating waste load out, personnel, and equipment pathways as part of the exclusion zone.
- Protecting all areas of the property where work activities are performed from inclement weather by implementing any reasonable safeguards necessary during removal and restoration activities.
- Ensuring that power is supplied to any refrigerators, freezers, or other items identified in the site-specific work plan or by the A&E.
- Providing fire extinguishers, in accordance with OSHA Standard 29 CFR 1926.150(c)(1)(VI), throughout the site's work areas including, but not limited to, the exclusion zone and decontamination facility.

- Using all necessary precautions to ensure the structural integrity of the building is maintained during remediation activities.
- Repairing or replacing in kind all items damaged during remediation activities.
- Moving automobiles, trailers, campers, or other similar items, if necessary, before cleanup activities, but only after the appropriate owner's permission is granted. These items will be returned to their original location by the removal contractor after restoration activities are complete.
- Protecting site utility piping from freezing conditions and sensitive property features against weather elements. If freezing temperatures are expected, negative air machines may be turned off during nonwork hours once bulk removal is complete, with prior approval of A&E H&S.
- Adhering to all transportation and disposal requirements stated in the RAWP, including Section 16 of the Construction Specifications (Appendix A). All ACM waste generated during removal activities, with the exception of soil, will be disposed of at the Landfill. No polyethylene sheeting or PPE of any kind is to be disposed of at the mine site repository.
- Developing a handling plan for the collection, storage, transportation, and disposal of liquid waste generated at remediation properties.
- Implementing pollution control measures throughout all site activities.

The removal contractor will be responsible for maintaining these aspects of site preparation, and all appropriate safety precautions, throughout the duration of removal and restoration activities.

6.4.1 Protection of Existing Features

The removal contractor will be responsible for protecting existing features and systems of the property that are to be left in place. The heating, ventilating, and air conditioning (HVAC) system should be rendered inoperable, sealed, and isolated to protect it from contamination during removal contractor activities, in accordance with OSHA Standard 29 CFR 1926.1101(g)(4)(III). All appropriate LO/TO procedures are to be implemented for HVAC systems before the start of site work and throughout the duration of remediation activities.

The removal contractor will protect electrical wiring located in the site's work areas throughout the duration of remediation activities.

6.4.2 Containment Setup

The removal contractor will construct an exclusion zone inside the designated work area to ensure the health and safety of the workers and public. A&E H&S will evaluate the exclusion zone construction during the H&S inspection (Section 6.4.5) and must approve of the final design. No adjustment to the exclusion zone will occur without the prior approval of A&E H&S or oversight personnel.

The removal contractor is responsible for inspecting the designated containment areas to ensure that any penetrations that VCI or other contaminated materials may escape from or leak into as a result of remediation activities are identified and permanently sealed.

The removal contractor will design a negative pressure enclosure (NPE) encompassing the exclusion zone to isolate the removal activities and prevent unwanted structure migration. The NPE will be constructed according to OSHA requirements, including OSHA Standard 29 CFR 1926.1101(g)(5). All critical barriers such as, but not limited to, exposed vents, grilles, and windows inside of the work area must be HEPA vacuumed before being sealed. All activities within the designated NPE will be performed in Level C, with appropriate respiratory protection and PPE as defined in Section 7 of the CSHASP.

The removal contractor will place the NPE under negative pressure by installing HEPA-equipped negative air filtration units. HEPA air filtration units are to achieve a minimum of four air exchanges per hour, in accordance with OSHA Standard 29 CFR 1926.1101(g)(5)(i)(A)(2), and are to be placed in a manner that pulls contamination away from the worker's breathing zone. HEPA air filtration units will be exhausted to outside air rather than into another part of the building.

Asbestos warning and PPE requirement signs, in accordance with OSHA Standard 29 CFR 1926.1101(k)(7)(ii)(B), will be posted by the removal contractor at all ingress and egress points of the exclusion zone so that site personnel may read the signs and be aware of necessary protective steps before entering the exclusion zone.

The removal contractor shall install Z-flaps at ingress and egress points using two layers of 6-mil fire-retardant polyethylene sheeting to allow passage into the NPE while minimizing migration of contaminants to the outside. Tyvek suit change-out stations, or other means approved by A&E H&S, will be required to prevent cross-contamination if accessing the designated containment area through a clean living space or loading out ACM waste.

The removal contractor will provide adequate lighting within the work areas, in accordance with OSHA Standard 29 CFR 1926.56(b).

The removal contractor will address any potential fall hazards within the work areas, in accordance with OSHA Standard 29 CFR 1926.501.

The removal contractor must build containments of sufficient size to allow for proper work safety practices (e.g., use of Tyvek change-out stations), extending the containment beyond the contaminated area if necessary. All containment extensions require prior approval by A&E H&S.

The removal contractor is responsible for inspecting and maintaining the designated containment areas to ensure they are of sound construction and functioning as designed until final clearance criteria are met.

The removal contractor is responsible for ensuring that all appropriate ACM handling procedures are implemented and in accordance with OSHA Standard 29 CFR 1926.1101(l)(2).

Once the exclusion zone has been approved by A&E H&S, all personnel entering the exclusion zone must wear the appropriate Level C PPE for their assigned task. Removal contractors are required to provide a PPE training program for personnel within their SSHASPs. Section 7 of the CSHASP provides a review of task-based project PPE requirements.

6.4.3 Personnel Decontamination

The removal contractor will establish a properly demarcated, HEPA-filtered, 3-stage decontamination trailer or equivalent, hereafter referred to as a facility, consisting of an equipment room (dirty room), shower area, and a clean room for personnel decontamination, in accordance with OSHA Standard 29 CFR 1926.1101(g). Personnel decontamination procedures must be posted in the clean and dirty rooms so that personnel may read and take necessary steps to ensure their safety. The removal contractor must perform regular housekeeping duties within all decontamination facility rooms to ensure and maintain their cleanliness. Documentation of such housekeeping will be posted in the clean room of the decontamination facility and made available to A&E H&S upon request.

The removal contractor is responsible for maintaining these 3-stage decontamination facilities onsite until clearance results meet removal clearance criteria.

The removal contractor will use potable water for all personnel decontamination, in accordance with OSHA Standard 29 CFR 1910.141(b)(1)(i). All potable water delivery systems must be disinfected on a regular schedule, with greater frequency during the summer months. The removal contractor must submit to the Volpe Center a schedule for disinfection of its potable water systems. Documentation of potable water equipment inspections and disinfections must be maintained by the removal contractor, made visible to personnel using a particular water source, and provided to A&E H&S upon request. Wastewater generated from personnel decontamination must be disposed of at the Landfill, or passed through a 20- and 5-micron filter and disposed of as sanitary waste. The removal contractor shall set up one decontamination facility for each property or group of properties if the properties are contiguous.

Upon approval from A&E H&S, if removal activities are expected to last for less than one-half of a work day (i.e., less than 4 hours), the removal contractor may perform small-scale, short-duration removals in Modified Level C PPE and without a 3-stage decontamination facility at the site. If permission is granted for Modified Level C PPE (defined in Section 7 of the CSHASP), the removal contractor must maintain a suitable means onsite, approved by A&E H&S, for PPE, equipment, and personnel decontamination. This means of decontamination will be maintained onsite by the removal contractor until clearance results meet removal clearance criteria.

Specific requirements regarding the decontamination process for both personnel and equipment are to be presented in the removal contractor's SSHASP.

6.4.4 Equipment Decontamination

The removal contractor will be responsible for decontaminating or disposing of any equipment or materials used for removal activities within the exclusion zone. Items undergoing decontamination will be wet wiped and/or HEPA vacuumed before leaving

the exclusion zone. Items to be disposed of will be bagged and handled as ACM before leaving the exclusion zone.

6.4.5 H&S Inspection

The removal contractor's SHSO will be responsible for inspecting all aspects of a site's setup before an inspection by A&E H&S. The removal contractor's SHSO will notify A&E H&S when a site's setup is ready for inspection and an AHA Form has been completed. A&E H&S will then perform a site containment inspection to ensure compliance with applicable project and OSHA regulations. Removal work may not begin until a site's setup is approved by A&E H&S.

6.4.6 Moving/Cleaning of Household Items

The removal contractor shall HEPA vacuum and/or wet wipe all items within the designated containment areas. All items, such as clothing, that are in contact with VCI will be cleaned or disposed of by the removal contractor as stated in the site-specific work plans. If items are moved from the removal area and stored in a Connex-type box, an inventory will be prepared by the removal contractor. All removal of household items from the removal area requires prior approval by A&E oversight.

6.5 VCI Removal from Attics

6.5.1 Building Material Demolition

Any demolition required to access and remove VCI will be stated in the site-specific work plans. Demolition activities not stated in site-specific work plans will require prior approval by the Volpe Center. Demolition may consist of cutting, sawing, or other intrusive activities used to access VCI for removal. The removal contractor may not begin any demolition work until it is approved by A&E H&S. The removal contractor will inform A&E oversight personnel before commencing and upon completing demolition activities each work day.

The removal contractor's competent person will evaluate demolition work to ensure that the required engineering controls and work practices necessary to perform the job in a safe manner have been properly implemented.

All interior demolition activities must be performed with point-of-cut ventilated (POCV) power tools. All tools and equipment used by the removal contractor to perform demolition activities must be approved by A&E H&S. Additional engineering controls to minimize particulate levels, such as construction of mini enclosures to isolate demolition activities, use of automatic misters, and use of HEPA-equipped local exhaust ventilation, may be instituted upon approval from A&E H&S.

Building materials will be disposed of at the Landfill. Before transporting this ACM to the Landfill for disposal, the removal contractor will prescreen the waste for acceptability at the facility. Any unacceptable material found during the prescreening process shall be removed from the waste stream by the removal contractor and documented, appropriately manifested, containerized, and separately disposed of at facilities licensed to accept such

wastes in accordance with state and federal regulations. The government will sign all manifests and bills of lading prepared by its removal contractors.

The removal contractor shall process demolition debris for disposal in the Landfill into relatively small pieces, such that the debris passes through the tailgate of a dump truck, can be covered with 6 inches of daily cover soil, and can be compacted in place by the Landfill operator.

6.5.2 Bulk Removal

The removal contractor will perform bulk removal of VCI in attics, as identified in the site-specific work plan, using a HEPA-equipped vacuum apparatus. All bulk removal activities will be conducted with proper engineering controls and work practices to ensure personnel safety and removal success. Adequate dust suppression must be maintained throughout the duration of bulk removal activities. Dust suppression may be achieved by using adequate amounts of potable water through automatic misters, airless sprayers, or Hudson sprayers. Amended water may also be used if necessary. Water usage will be carefully controlled by the removal contractor to ensure that property damage does not occur.

The removal contractor will use proper work practices such as good housekeeping, strategic cleaning from clean to dirty, and proper planning to create a safe and productive work environment during bulk removal activities. The removal contractor will also employ administrative controls, such as limiting the number of personnel and the amount of unnecessary vacuum hose in the NPE, to minimize particulate levels.

As established by EPA removal criteria, the removal contractor will remove other insulation, such as, but not limited to, fiberglass or cellulose, if it is in contact or shares airspace with existing VCI. Insulation may only be removed in accordance with site-specific work plans or by approval from the Volpe Center.

Once the removal contractor's competent person determines that bulk removal is complete, work will proceed to detail cleaning. The removal contractor's competent person is responsible for ensuring that appropriate respiratory protection and engineering controls are maintained when transitioning between bulk removal and detail cleaning.

6.5.3 Detail Cleaning

The purpose of the detail cleaning is to remove any remaining insulation from cracks and crevices.

Once the removal contractor's site supervisor determines detailing activities are complete, they will request an inspection from A&E H&S personnel. A&E H&S will inspect the removal areas to ensure that all cleaning activities have been performed according to site-specific work plan requirements and project removal criteria.

6.5.4 Blocking

Blocking activities are to be performed only with prior approval from A&E H&S.

If there is insulation in a particular area that is determined by A&E H&S to be unreachable, the removal contractor may construct a suitable permanent barrier or blocking, as directed and approved by A&E H&S, to prevent future access. Blocking is to be installed in a manner such that moisture does not build up in insulated areas.

Blocking material in nonliving areas may consist of 1-inch Styrofoam Brand closed cell polystyrene insulation as manufactured by Dow Chemical Company, plywood, or an equivalent approved by the Volpe Center. The type of blocking material used in each removal scenario will require prior approval of A&E H&S and will be determined at the A&E H&S inspection following detail cleaning.

Blocking materials in living space areas will consist of replacement-in-kind materials or rigid sheeting (i.e., ½-inch plywood or equivalent) and will be specified in site-specific work plans.

Existing ventilation pathways will not be completely blocked without prior approval by the Volpe Center.

A&E oversight will verify and document that the appropriate blocking was performed by the removal contractor.

6.5.5 Encapsulation

The removal contractor may apply colorless encapsulant in nonliving space removal areas when detail cleaning is completed. Encapsulation activities are to be performed only with prior approval from A&E H&S.

The removal contractor will use encapsulant that has been approved for project usage by the Volpe Center. The encapsulant will be applied aggressively to all accessible removal area surfaces by using an airless sprayer in conjunction with a 1-horesepower (hp) leaf blower to ensure proper dispersal. The purpose of the encapsulant is to "lock down" any remaining asbestos structures and prevent them from becoming airborne should they be disturbed at a later date. The removal contractor will ensure that sufficient encapsulant is used to adequately lock down any remaining asbestos structures.

If VCI or other material becomes dislodged during the application of encapsulant, the removal contractor will remove this material before the encapsulant dries and before final air clearance samples are collected.

The removal contractor is responsible for using sufficient care during application of encapsulant to prevent any damage to direct and indirect areas of the structure. The removal contractor is responsible for repair or replacement of any materials or items damaged as a result of its application.

6.6 VCI Removal from Areas to be Remodeled

As determined by EPA, VCI may be removed from certain contained areas, such as, but not limited to, walls, floors, and ceilings, when the property owner intends to remodel their home or business immediately following the removal or where building materials are in extremely poor condition.

The removal contractor will adhere to the procedures outlined previously in Sections 6.5.1 through 6.5.5 of this RAWP when removing VCI from areas to be remodeled.

6.7 VCI Removal from Crawl Spaces

All contaminated material removal to be performed in crawl spaces will be evaluated separately, done in accordance with site-specific work plans, and will require approval of A&E H&S.

The removal contractor will be responsible for protecting and maintaining the integrity of all foundation and support system features within crawl spaces.

6.8 Structure Demolition

All structure demolitions will be evaluated separately, done in accordance with site-specific work plans, and will require approval of the Volpe Center. Demolition specifications are presented in Appendix A (Construction Specifications, Section 13).

Structure demolition materials will be disposed of at the Landfill. Before transporting this ACM to the Landfill for disposal, the removal contractor will prescreen the waste for acceptability at the facility. Prescreening will involve visual inspection of residential, commercial, industrial, and public buildings to be demolished. Any liquid materials such as paint cans, cleaners, solvents, petroleum products, and pesticides shall be removed from the building by the removal contractor before vermiculite removal, ACM removal, or demolition. In addition, the removal contractor shall remove glues, resins, dyes, oils, pesticides, and any other household hazardous wastes from the building and inspect the building for polychlorinated biphenyl (PCB)-containing light fixtures. Any unacceptable material found during the prescreening process shall be removed from the waste stream by the removal contractor and documented, appropriately manifested, containerized, and separately disposed of at facilities licensed to accept such wastes, in accordance with state and federal regulations. The government will sign all manifests and bills of lading prepared by its removal contractors.

The removal contractor shall process demolition debris for disposal in the Landfill into relatively small pieces, such that the debris passes through the tailgate of a dump truck, can be covered with 6 inches of daily cover soil, and can be compacted in place by the Landfill operator.

6.9 Sealing of Penetrations

In structures undergoing remediation activities, the removal contractor must inspect all living space areas to determine if VCI has leaked into outlets, switches, light fixtures, ceiling fans, electrical boxes, vents, and any other penetrations. The removal contractor must provide results of the inspection to A&E oversight personnel.

If any VCI was observed, the penetration(s) must be cleaned and sealed by the removal contractor with flame-retardant, project-approved foam sealant or caulk that provides a colorless or clear finish. The removal contractor will seal all penetrations that are in direct contact with source material.

All penetration covers are to be removed by the removal contractor and will remain off until A&E oversight or H&S has inspected the areas.

6.10 Personal Breathing Zone Air Sampling

The A&E will collect and analyze task-based personal BZ air samples on removal contractor personnel conducting VCI removal to document that the level of respiratory protection is adequate for the task being conducted. All personal BZ sampling will be conducted in accordance with the SAP (CDM 2008c). Sampling frequencies for personal BZ air monitoring were established using task-based personal BZ sampling data collected during the 2002 - 2006 Libby Project field seasons. Personal BZ air sampling will consist of collecting one TWA sample and one STEL (i.e., one 30-minute excursion) sample per task a minimum of every 6 months. Sampling frequencies are defined in A&E Air Monitoring Frequencies provided in Appendix B, and are adjusted as necessary.

If personal BZ samples are reported above the respective permissible exposure limit for the appropriate sample, then the sample will be confirmed by TEM as specified in the SAP (CDM 2008c). If the result is confirmed by TEM, the Volpe Center, A&E H&S, and removal contractor will assess work practices, evaluate contributing factors, and modify engineering controls as necessary.

The A&E will supply BZ sample results to the removal contractor to satisfy OSHA requirements. The removal contractor is responsible for posting these results in a location readily available to its employees.

6.11 Final Clearance Air Samples

If the designated containment area requires encapsulation, final clearance air samples will be collected by the A&E after the encapsulant has been applied and allowed to dry and after all blocking activities are complete. Each containment area will have its own clearance sampling event. Final air clearance sampling will be conducted by the A&E in accordance with the SAP (CDM 2008c)

Once the clearance criteria have been met, the removal contractor may remove the containment, and restoration of the removal area can begin.

Details regarding action levels and clearance criteria are found in the EPA *Action Level and Clearance Criteria Technical Memorandum, Libby Asbestos Site* (EPA 2003a) and its revisions. Action levels and clearance criteria are subject to revision by EPA.

6.12 Security

For removal properties requiring relocation of the residents, the government will supply a qualified security contractor to provide security whenever the removal contractor is not onsite. The removal contractor will coordinate with the A&E to ensure that proper security is being provided during the time the resident is relocated from their property. The level of security may vary from periodic patrols to onsite full-time based on the location of the property and whether it is adjacent or close to other properties being remediated. This will be evaluated and determined by the Volpe Center.

The removal contractor is responsible for site security during regular working hours (when the government-provided security contractor is not onsite).

Section 7
Contaminated Dust Removal (Interior Cleaning)

The removal contractor will perform LA asbestos-contaminated dust removals from residential, commercial, and industrial properties in accordance with removal and clearance criteria established by EPA. Details regarding action levels and clearance criteria for contaminated dust removal are found in the *Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum* (EPA 2003a) and its revisions. Action levels and clearance criteria are subject to revision by EPA.

The removal contractor will furnish all labor, supervision, materials, equipment, tools, permits, and incidentals necessary to perform all interior cleaning activities.

If it is determined by A&E H&S that the residents must be temporarily relocated during remediation activities, they will be required to leave their homes and/or property. Upon approval from the Volpe Center, the resident will be provided with temporary housing by the government. The government will be responsible for the cost of any approved relocation and will provide to the resident(s), the government's daily food allotment for the duration of their relocation.

Businesses may be closed during remediation activities. No costs for loss of business will be provided by EPA. However, relocation assistance may be provided upon approval by EPA.

Removal contractors are required to adhere to their submitted removal schedule to minimize the impact of the cleanup on the residents or businesses.

Due to the hazardous nature of the work, access to properties for residents or business owners will not be allowed until the results of the clearance samples meet the clearance criteria established by EPA and all restoration work that could significantly impact the resident's or business owner's health and safety is completed. Only under emergency situations will items be retrieved. Economic and time considerations for the property's residents or businesses will be considered when scheduling work.

EPA will provide HEPA vacuums to owners whose properties have undergone cleanups. The Volpe Center is responsible for procuring and distributing HEPA vacuums in accordance with the *HEPA Vacuum Program Memorandum* (Volpe Center 2003). The A&E is responsible for distributing HEPA vacuums in accordance with the memorandum.

7.1 Removal Contractor Documentation

Removal contractors are responsible for submitting to the Volpe Center, as part of their SSHASP, a Designation of Competent Person Form (Form L of CSHASP Appendix A), which designates a competent person for each work safety category listed.

The removal contractor's SHSO and competent person is each responsible for providing regular and frequent inspections of removal property activities, including site

preparation, removal, and restoration activities, to ensure that appropriate precautions are implemented to protect public and worker safety. These inspections are to be documented by both the SHSO and competent person and made available to the Volpe Center at the biweekly H&S meetings. The biweekly H&S meetings will be conducted by A&E H&S, with the Volpe Center Site Manager, removal contractor SHSO, and A&E H&S in attendance.

In addition, the removal contractor is responsible for completing an AHA Form (Form G of the CSHASP's Appendix A) for each removal property and updating the AHA throughout the different phases of removal/restoration. The AHA Form will be submitted by the removal contractor to A&E H&S for review before the start of a site's removal work, and must be posted at the site throughout project activities. All AHA forms must be submitted to A&E H&S by the removal contractor's SHSO upon property completion.

7.2 Subcontractor Activities

The removal contractor is responsible for any project work performed by its subcontractors, including pre-worksite, site preparation, site removal, and site restoration activities. The removal contractor is responsible for ensuring that its subcontractors adhere to all applicable federal, state, and project requirements and guidance documents, including the CSHASP, removal contractor SSHASP, RAWP, and site-specific work plans.

7.3 Pre-Worksite Activities

Before beginning any site preparation activities, the removal contractor and A&E are each responsible for:

- Conducting a site walkthrough and thoroughly documenting the site's existing conditions, including but not limited to: existing feature damage, existing structure material damage, operability of utility systems within designated work zones, equipment pathways and placement areas, changes in conditions that could result in the presence of LA asbestos after prior investigations were completed, and an inspection of all interior and exterior areas.

Appropriate levels of respiratory protection for project-related activities are provided in Section 7 of the CSHASP. Removal contractors are also required to provide a PPE training program for personnel within their SSHASPs.

7.4 Site Preparation

A&E oversight will hold a tailgate meeting on the first day of site setup, with the removal contractor site supervisor and A&E CIC in attendance, to review site remediation activities and to ensure that the removal contractor and A&E oversight personnel have consistent and current site-specific work plans. Additionally, imminent hazards identified will be evaluated by A&E oversight and the removal contractor site supervisor to determine if corrective actions are necessary.

The removal contractor is responsible for the following:

- Implementing safety precautions, including use of appropriate PPE, if contaminated materials are expected to be disturbed.
- Using appropriate engineering controls to prevent contaminant migration as a result of remediation activities.
- Implementing and maintaining dust control throughout the duration of site activities, from site preparation through restoration, in accordance with MCA Title 75 (Environmental Protection), ARM Title 17, and NESHAPs asbestos regulations (40 CFR Part 61).
- Ensuring that all vacuums used on the project have HEPA filters that meet the definition as stated in OSHA Standard 29 CFR 1926.1101(b). The removal contractor will provide HEPA filter documentation to A&E H&S for each manufacturer's model of vacuum. The removal contractor will document the regular maintenance (e.g., changing of HEPA filters) performed on all vacuums, making this documentation available to A&E H&S upon request.
- Maintaining a copy of contract documents, including the site-specific work plan and SSHASP, at each work site throughout setup, removal, and restoration activities.
- Providing temporary electric power and potable water for the duration of site activities.
- Ensuring that all appropriate LO/TO procedures, in accordance with project and OSHA requirements, including OSHA Standards 29 CFR 1926.416 and 29 CFR 1926.417, are implemented for a structure's electrical sources throughout the duration of removal and restoration activities.
- Ensuring electrical safety throughout all phases of site activities as required in Section 4.5.7 of the CSHASP and all applicable OSHA Standards, including 29 CFR 1926 Subpart K. All activities with the potential to be performed within 10 feet of energized overhead electrical lines must be evaluated as part of the site AHA by the removal contractor, and appropriate precautions must be implemented before remediation work may begin.
- Ensuring that only licensed electricians perform electrical repair work at a site.
- Ensuring that only licensed electricians perform disconnections and reconnections of all electrical circuits.
- Ensuring that only licensed plumbers perform plumbing repair work at a site.
- Ensuring that only licensed personnel perform repair work on gas, propane, or oil lines at a site.
- Identifying and posting residential traffic and pedestrian points of hazard with legible traffic signs, in accordance with OSHA Standard 29 CFR 1926.200(g)(1), throughout the duration of removal and restoration activities.

- Providing site signage in compliance with DOT regulations, including temporary stop signs when necessary.
- Identifying and evaluating any existing residential mechanical equipment within the work zones, isolating or removing any potential hazards.
- Placing/Staging removal equipment such as, but not limited to, vacuum machines, vacuum boxes, decontamination trailers, and water storage tanks in a manner that minimizes inconvenience and risk to the public.
- Keeping all sidewalks and other public access pathways free of equipment during nonwork hours, or providing a sufficiently permanent barrier to prevent pedestrian or vehicle access. Blocked pedestrian or vehicle access pathways will require rerouting by the removal contractor in accordance with OSHA Standard 29 CFR 1926.200(g)(2).
- Securing sites to prevent children and pets from accessing work areas during work and nonwork hours.
- Demarcating exclusion zone boundaries and posting ingress/egress points with appropriate asbestos and PPE signage in accordance with OSHA Standard 29 CFR 1926.1101(k)(7)(i). All removal activities will be conducted within an appropriately designed exclusion zone. The exclusion zone boundaries may only be removed when final clearance criteria are met.
- Demarcating support zone boundaries with orange fencing and yellow caution tape.
- Demarcating waste load out, personnel, and equipment pathways as part of the exclusion zone.
- Protecting all areas of the property where work activities are performed from inclement weather by implementing any reasonable safeguards necessary during removal and restoration activities.
- Ensuring that power is supplied to any refrigerators, freezers, or other items identified in the site-specific work plan or by the A&E.
- Providing fire extinguishers, in accordance with OSHA Standard 29 CFR 1926.150(c)(1)(VI), throughout the site's work areas including, but not limited to, the exclusion zone and decontamination facility.
- Using all necessary precautions to ensure the structural integrity of the building is maintained during remediation activities.
- Repairing or replacing in kind all items damaged during remediation activities.
- Moving automobiles, trailers, campers, or other similar items, if necessary, before cleanup activities, but only after the appropriate owner's permission is granted. These items will be returned to their original location by the removal contractor after restoration activities are complete.

- Protecting site utility piping from freezing conditions and sensitive property features against weather elements. If freezing temperatures are expected, negative air machines may be turned off during nonwork hours once bulk removal is complete, with prior approval of A&E H&S.

- Adhering to all transportation and disposal requirements stated in the RAWP, including Section 16 of the Construction Specifications (Appendix A). All ACM waste generated during removal activities, with the exception of soil, will be disposed of at the Landfill. No polyethylene sheeting or PPE of any kind is to be disposed of at the mine site repository.

- Developing a handling plan for the collection, storage, transportation, and disposal of liquid waste generated at remediation properties.

- Implementing pollution control measures throughout all site activities.

The removal contractor will be responsible for maintaining these aspects of site preparation, and all appropriate safety precautions, throughout the duration of removal and restoration activities.

7.4.1 Protection of Existing Features

The removal contractor will be responsible for protecting existing features and systems of the property that are to be left in place. The HVAC system should be rendered inoperable, sealed, and isolated to protect it from contamination during removal contractor activities, in accordance with OSHA Standard 29 CFR 1926.1101(g)(4)(III). All appropriate LO/TO procedures are to be implemented for HVAC systems before the start of site work and throughout the duration of remediation activities.

The removal contractor will protect electrical wiring located in the site's work areas throughout the duration of remediation activities.

7.4.2 Containment Setup

The removal contractor will construct an exclusion zone inside the designated work area to ensure the health and safety of the workers and public. A&E H&S will evaluate the exclusion zone construction during the H&S inspection (Section 7.4.5) and must approve of the final design. No adjustment to the exclusion zone will occur without the prior approval of A&E H&S or oversight personnel.

The removal contractor is responsible for inspecting the designated containment areas to ensure that any penetrations that contaminated dust or other materials may escape from or leak into as a result of remediation activities are identified and permanently sealed.

The removal contractor shall design an NPE encompassing the exclusion zone to isolate the removal activities and prevent unwanted structure migration. The NPE will be constructed according to OSHA requirements, including OSHA Standard 29 CFR 1926.1101(g)(5). All critical barriers such as, but not limited to, exposed vents, grilles, and windows inside of the work area must be HEPA vacuumed before being sealed. All

activities within the designated NPE will be performed in Level C, with appropriate respiratory protection and PPE as defined in Section 7 of the CSHASP.

The removal contractor will place the NPE under negative pressure by installing HEPA-equipped negative air filtration units. HEPA air filtration units are to achieve a minimum of four air exchanges per hour, in accordance with OSHA Standard 29 CFR 1926.1101(g)(5)(i)(A)(2), and are to be placed in a manner that pulls contamination away from the worker's breathing zone. HEPA air filtration units will be exhausted to outside air rather than into another part of the building.

Asbestos warning and PPE requirement signs, in accordance with OSHA Standard 29 CFR 1926.1101(k)(7)(ii)(B), will be posted by the removal contractor at all ingress and egress points of the exclusion zone so that site personnel may read the signs and be aware of necessary protective steps before entering the exclusion zone.

The removal contractor will install Z-flaps at ingress and egress points using two layers of 6-mil fire-retardant polyethylene sheeting to allow passage into the NPE while minimizing migration of contaminants to the outside. Tyvek suit change-out stations, or other means approved by A&E H&S, will be required to prevent cross-contamination if accessing the designated containment area through a clean living space.

The removal contractor will provide adequate lighting within the work areas, in accordance with OSHA Standard 29 CFR 1926.56(b).

The removal contractor will address any potential fall hazards within the work areas, in accordance with OSHA Standard 29 CFR 1926.501.

The removal contractor must build containments of sufficient size to allow for proper work safety practices (e.g., use of Tyvek change-out stations), extending the containment beyond the contaminated area if necessary. All containment extensions require prior approval by A&E H&S.

The removal contractor is responsible for inspecting and maintaining the designated containment areas to ensure they are of sound construction and functioning as designed until final clearance criteria are met.

The removal contractor is responsible for ensuring that all appropriate ACM material handling procedures are implemented and in accordance with OSHA Standard 29 CFR 1926.1101(l)(2).

Once the exclusion zone has been approved by A&E H&S, all personnel entering the exclusion zone must wear the appropriate Level C PPE for their assigned task. Removal contractors are required to provide a PPE training program for personnel within their SSHASPs. Section 7 of the CSHASP provides a review of task-based project PPE requirements.

7.4.3 Personnel Decontamination

The removal contractor will establish a properly demarcated, HEPA-filtered, 3-stage decontamination trailer or equivalent, hereafter referred to as a facility, consisting of an equipment room (dirty room), shower area, and a clean room for personnel

decontamination, in accordance with OSHA Standard 29 CFR 1926.1101(g). Personnel decontamination procedures must be posted in the clean and dirty rooms so that personnel may read and take necessary steps to ensure their safety. The removal contractor must perform regular housekeeping duties within all decontamination facility rooms to ensure and maintain their cleanliness. Documentation of such housekeeping will be posted in the clean room of the decontamination facility and made available to A&E H&S upon request.

The removal contractor is responsible for maintaining these 3-stage decontamination facilities onsite until clearance results meet removal clearance criteria.

The removal contractor will use potable water for all personnel decontamination, in accordance with OSHA Standard 29 CFR 1910.141(b)(1)(i). All potable water delivery systems must be disinfected on a regular schedule, with greater frequency during the summer months. The removal contractor must submit to the Volpe Center a schedule for disinfection of its potable water systems. Documentation of potable water equipment inspections and disinfections must be maintained by the removal contractor, made visible to personnel using a particular water source, and provided to A&E H&S upon request. Wastewater generated from personnel decontamination must be disposed of at the Landfill, or passed through a 20- and 5-micron filter to be disposed of as sanitary waste. The removal contractor will set up one decontamination facility for each property or group of properties if the properties are contiguous.

Upon approval from A&E H&S, if removal activities are expected to last for less than one-half of a work day (i.e., less than 4 hours), the removal contractor may perform small-scale, short-duration removals in Modified Level C and without a 3-stage decontamination facility at the site. If permission is granted for Modified Level C PPE (defined in Section 7 of the CSHASP), the removal contractor must maintain a suitable means onsite, approved by A&E H&S, for PPE, equipment, and personnel decontamination. This means of decontamination will be maintained onsite by the removal contractor until clearance results meet removal clearance criteria.

Specific requirements regarding the decontamination process for both personnel and equipment are to be presented in the removal contractor's SSHASP.

7.4.4 Equipment Decontamination

The removal contractor will be responsible for decontaminating or disposing of any equipment or materials used for removal activities within the exclusion zone. Items undergoing decontamination will be wet wiped and/or HEPA vacuumed before leaving the exclusion zone. Items to be disposed of will be bagged and handled as ACM before leaving the exclusion zone.

7.4.5 H&S Inspection

The removal contractor's SHSO will be responsible for inspecting all aspects of a site's setup before an inspection by A&E H&S. The removal contractor's SHSO will notify A&E H&S when a site's setup is ready for inspection and an AHA Form has been completed. A&E H&S will then perform a site containment inspection to ensure compliance with applicable project and OSHA regulations. Removal work may not begin until a site's setup is approved by A&E H&S.

7.4.6 Moving/Cleaning of Household Items

The removal contractor will HEPA vacuum and/or wet wipe all items within the designated containment areas. All items that are in contact with VCI will be cleaned or disposed of by the removal contractor as stated in the site-specific work plans. If items are moved from the removal area and stored in a Connex-type box, an inventory will be prepared by the removal contractor. All removal of household items from the removal area requires prior approval by A&E oversight.

7.5 Cleaning Procedures

The removal contractor will HEPA vacuum and/or wet wipe all horizontal and vertical surfaces to remove contaminated dust from the interior of the structure. Areas such as, but not limited to, closets, chest-of-drawers, and cabinets will not be opened for cleaning purposes during the interior cleaning process unless identified in the site-specific work plan. Clothes will remain in place and will not be cleaned or disposed of, unless in contact with VCI. All upholstery items (e.g., drapes, bedspreads, couches, and carpets) will be thoroughly cleaned with a HEPA vacuum.

Once the removal contractor's site supervisor determines interior cleaning activities are complete, they will request an inspection from A&E H&S. The inspection will ensure that all interior cleaning activities have been performed according to site-specific work plan requirements and project removal criteria.

7.5.1 Cleaning in Crawlspaces

All contaminated material removal to be performed in crawlspaces will be evaluated separately, done in accordance with site-specific work plans, and will require approval of A&E H&S.

The removal contractor will be responsible for protecting and maintaining the integrity of all foundation and support system features within crawlspaces.

7.5.2 Sealing of Penetrations

In structures undergoing remediation activities, the removal contractor must inspect all living space areas to determine if VCI has leaked into outlets, switches, light fixtures, ceiling fans, electrical boxes, vents, and any other penetrations. The removal contractor must provide results of the inspection to A&E oversight personnel.

If any VCI was observed, the penetration(s) must be cleaned and sealed by the removal contractor with flame-retardant, project-approved foam sealant or caulk that provides a colorless or clear finish. The removal contractor will seal all penetrations that are in direct contact with source material.

All penetration covers are to be removed by the removal contractor and will remain off until A&E oversight or H&S has inspected the areas.

7.6 Personal Breathing Zone Air Sampling

The A&E will collect and analyze task-based BZ air samples on removal contractor personnel conducting contaminated dust removal to document that the level of respiratory

protection is adequate for the task being conducted. All personal BZ sampling will be conducted in accordance with the SAP (CDM 2008c). Sampling frequencies for personal BZ air monitoring were established using task-based personal BZ sampling data collected during the 2002 - 2006 Libby Project field seasons. Personal BZ air sampling will consist of collecting one TWA sample and one STEL (i.e., one 30-minute excursion) sample per task a minimum of every 6 months. Sampling frequencies are defined in A&E Air Monitoring Frequencies provided in Appendix B, and are adjusted as necessary.

If personal BZ samples are reported above the respective permissible exposure limit for the appropriate sample, then the sample will be confirmed by TEM as specified in the SAP (CDM 2008c). If the result is confirmed by TEM, the Volpe Center, A&E H&S, and removal contractor will assess work practices, evaluate contributing factors, and modify engineering controls as necessary.

The A&E will supply BZ sample results to the removal contractor to satisfy OSHA requirements. The removal contractor is responsible for posting these results in a location readily available to its employees.

7.7 Final Clearance Air Sampling

Each containment area will have its own clearance sampling event. Final air clearance sampling will be conducted by the A&E in accordance with the SAP (CDM 2008c).

Once the clearance criteria have been met, the removal contractor may remove the containment, and restoration of the removal area can begin.

Details regarding action levels and clearance criteria are found in the EPA *Action Level and Clearance Criteria Technical Memorandum, Libby Asbestos Site* (EPA 2003a) and its revisions. Action levels and clearance criteria are subject to revision by EPA.

7.8 Security

For removal properties requiring relocation of the residents, the government will supply a qualified security contractor to provide security whenever the removal contractor is not onsite. The removal contractor will coordinate with the A&E to ensure that proper security is being provided during the time the resident is relocated from their property. The level of security may vary from periodic patrols to onsite full-time based on the location of the property and whether it is adjacent or close to other properties being remediated. This will be evaluated and determined by the Volpe Center.

The removal contractor is responsible for site security during regular working hours (when the government-provided security contractor is not onsite).

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Section 8
Restoration

Following the completion of removal activities, a property will be restored to a condition equal to that which existed before the removal work.

The removal contractor will decontaminate and demobilize the equipment used for the removal of contaminated soil, VCI, or contaminated dust before restoration. Property restoration will be conducted in Level D PPE and will adhere to the requirements outlined in the CSHASP. Removal contractors are also required to provide a PPE training program for personnel within their SSHASPs.

The removal contractor will furnish all labor, supervision, materials, equipment, tools, permits, and incidentals necessary to perform all exterior and interior restoration activities, except as noted in this section.

The removal contractor is responsible for submitting product samples, product data, and descriptions of the materials proposed for use in restoration before removal activities. All materials require approval by the Volpe Center and property owner before their usage. In addition, all materials used in restoration will be new and comply with local building codes.

Dust control will be maintained by the removal contractor at all times. No visible dust emissions are permitted during restoration activities, including transportation of materials to and from sites.

The removal contractor will provide all water necessary to control dust on the property and adjacent roadways, all water necessary for thorough compaction of backfill materials, and all other water necessary to complete restoration activities.

Restoration will comply with Construction Specifications (Appendix A) and the site-specific work plans. During restoration, A&E oversight personnel will perform inspections to ensure this compliance. Appropriate documentation will accompany these inspections.

8.1 Exterior Restoration

Once excavation activities are complete and all necessary clearance samples are collected and meet project-specific clearance criteria, the removal contractor will initiate property restoration.

8.1.1 Fill Material

Specific backfill material to be used for restoration is included in the site-specific work plans.

Fill material may consist of, but is not limited to, the following:

- Common fill
- Structural fill (¾-inch minus)
- Gravel (e.g., ¾-inch washed gravel, pea gravel)
- Topsoil
- Sand
- Potting soil

Unless otherwise noted, topsoil and common fill will be provided by Volpe Center-contracted suppliers. The removal contractor will coordinate with the onsite Volpe Center representative to place orders and schedule delivery. All orders for topsoil and/or common fill must be placed by the removal contractor at least 3 business days before delivery. All other fill material (e.g., structural fill, sand, gravel, potting soil) must be supplied and hauled to the site by the removal contractor. All fill material supplied by the removal contractor must be inspected, sampled (e.g., asbestos, organic/inorganic suite), and approved by the government before its project use. The removal contractor should allow a minimum of 3 weeks for inspection, sample collection, sample analysis, and approval.

8.1.1.1 Common Fill

Common fill will consist of mineral soil substantially free from organic materials, loam, wood, trash, and other objectionable materials that may be compressible or that cannot be properly compacted. Common fill will not contain stones larger than 3 inches in any dimension. Common fill will have a liquid limit less than 35 drops and a plasticity index less than 10, and will meet the following gradation percentages:

Sieve Size	Percent Finer by Weight
3 inches	100
No. 4	50 to 90
No. 40	15 to 85
No. 200	0 to 40

8.1.1.2 Topsoil

The topsoil material will be free of foreign matter and objects larger than 1 inch in any dimension and will meet the following criteria:

Parameter	Value
Texture	loam, sandy loam, or sandy clay loam
Organic Matter	3 to 10 percent
pH	6.0 to 8.0
Electrical Conductivity (EC)	<4 micromhos(mmhos)/centimeter
Sodium Absorption Ratio (SAR)	<12 milliequivalents(meq)/liter
Cation Exchange Capacity	10 to 25 meq/100 gram

The Volpe Center will specify organic content amendment requirements based on the quality control testing results from the government topsoil procurement program.

8.1.1.3 Other Fill Material

Other fill material may be required as part of the reconstruction and restoration effort. The site-specific work plan will include details on what other fill materials are necessary. All fill material, with the exception of common fill and topsoil, will be provided and hauled by the removal contractor.

Sand will meet the following gradation percentages:

Sieve Size	Percent Finer by Weight
No. 10	100
No. 18	90
No. 200	0

All gravel types and sizes will be specified in the site-specific work plans. Washed gravel will contain no fines.

Structural fill will conform to the requirements listed in Sections 6, 7, and 14 of the Construction Specifications in Appendix A, depending on its purpose.

Removal contractors will use locally available potting soil when necessary.

8.1.2 Placement, Grading, and Compaction

The removal contractor must notify A&E oversight of planned and completed backfilling activities, to coordinate A&E evaluations of grading and compaction.

Before backfilling, the excavation area will be examined by the removal contractor for any conditions detrimental to restoration. If any unfavorable conditions exist (e.g., saturated areas, snow, ice), backfilling will not begin until conditions change.

Backfilling and grading will be performed by the removal contractor in a manner and sequence that will avoid damage to properties, houses, garages, utility poles, fences, decks, sprinkler systems, streets, or other features near the work areas.

Subgrade fill material will be placed by the removal contractor using "clean-to-dirty" techniques. That is, subgrade fill material will be end-dumped from a clean area and spread to make a path for subsequent loads ensuring the haul trucks do not drive over any contaminated areas.

The removal contractor will begin placing topsoil opposite of where common fill placement began, so that haul trucks do not repeatedly drive over newly placed topsoil. The removal contractor will be responsible for correcting the compaction of any fill material the government or A&E finds unsatisfactory, at no additional cost to the government.

The removal contractor is responsible for ensuring that:

- All placed and compacted common fill subgrade material, topsoil, and other fill material (e.g., structural fill and gravel) is sloped away from building foundations, regardless of original grade, to allow for proper water drainage. The top of grade will exhibit a minimum slope of 2 percent within 10 feet, away from foundations.

- All original site grades not interfering with proper drainage (i.e., away from building foundations) are maintained, as indicated on the site-specific work plans.

- Original site drainage conditions are not altered in any way that negatively impacts or damages site materials or buildings.

Compaction equipment will be of suitable type and adequate to obtain the soil densities specified herein and will provide satisfactory breakdown of materials to form a dense fill. Acceptable compaction equipment includes pneumatic tire, tamping foot, sheepsfoot roller, or vibratory plate compactor. The use of other compaction equipment by the removal contractor requires prior approval by the Volpe Center.

The removal contractor will be solely responsible for modifications to the moisture content of all materials required to achieve the specified compactions herein.

The removal contractor will be responsible for the quality of work and materials during earthwork operations and for any settlement of backfill materials. All work found unsatisfactory to the government or A&E will be corrected by the removal contractor in an approved manner and at no additional cost to the government.

8.1.2.1 Common Fill

Common fill will be used to backfill the excavated area to within 6 inches below final grade in yard areas and to within 18 inches below final grade in gardens or flowerbeds, as indicated in the site-specific work plan. Modifications to this criterion may be directed by EPA.

The common fill material will be placed and compacted with a moisture content that produces a relatively uniform finish, free from irregular surface changes. Common fill will be placed in layers (lifts) that result in compacted soil not exceeding 6 inches in thickness. The fill lifts will be compacted to at least 90 percent of the maximum dry density, within 3 percent of optimum moisture, as determined by laboratory test American Society for Testing Materials (ASTM) D698 (standard Proctor). The A&E will perform periodic compaction tests to ensure placed material meets the required compaction.

8.1.2.2 Topsoil

Topsoil will be used to backfill the top 6 inches of the excavation in yard areas, the top 12 inches of the excavation in flowerbeds, and the top 18 inches of the excavation in gardens, as indicated on the site-specific work plan. Modifications to this criterion may be directed by EPA.

The removal contractor will not place topsoil over frozen subgrade, snow, ice, saturated soil, or ponded water. The topsoil will be placed so that haul trucks do not repeatedly drive over newly placed topsoil.

In yard areas, the topsoil will be lightly compacted during placement with a tracked-Bobcat, hand roller, or equivalent. All topsoil below 2 inches from finished grade will be compacted to a minimum of 75 percent and a maximum of 85 percent of the maximum dry density as determined by laboratory test ASTM D698 (standard Proctor). The top 2 inches of topsoil will be left uncompacted, or loosened after placement if necessary, so that the topsoil will properly accept growth media. Topsoil will be placed within 3 percent of optimum moisture.

In gardens and flowerbeds, the topsoil will be placed and compacted with hand-tools. All topsoil below 4 inches from finished grade will be compacted to a minimum of 75 percent and a maximum of 85 percent of the maximum dry density as determined by laboratory test ASTM D698 (standard Proctor). The top 4 inches of topsoil will be left uncompacted, or loosened after placement if necessary, so that the topsoil will properly accept growth media. To account for settling, topsoil will be mounded 4 inches above borders in gardens, flowerbeds, and planters. Immediately after placement, the surface will be hand-raked to remove stiff clods, lumps, roots, other foreign material, and objects larger than 1 inch in

any dimension. All depressions caused by settlement will be filled with additional topsoil, compacted, and regraded to match existing contours.

In locations to receive sod, the removal contractor is required to coordinate the finish grade of the rolled topsoil with the government's landscaping contractor. Typically sod settles approximately 1 to 1½ inches depending on subgrade preparation. The removal contractor will place, grade, and compact topsoil so that when the sod is initially placed, it is 1 to 1½ inches above an abutting lawn, sidewalk, or driveway surface elevation to allow for the anticipated settlement. Fine hand grading, in areas within 1 foot of the abutting lawn, sidewalk, or driveway to receive sod, will be the responsibility of the government's landscaping contractor. Once the sod has settled, it must blend into abutting lawn areas, sidewalks, and driveways so that there are no tripping hazards.

8.1.3 Fences, Decks, and Other Exterior Items

Any fences, decks, or other items temporarily removed during site preparation will be reassembled or replaced in kind by the removal contractor, as stated in the site-specific work plan. These items will be reassembled or replaced before installing landscaping. Any damages incurred during disassembly will be repaired by the removal contractor. Upon completion, these structures will be inspected by the government representative for quality of work and durability. If sheds or other structures were removed during site preparation, they will be returned to their original locations as specified in the site-specific work plan.

8.1.4 Landscaping

All landscaping will be performed by the government landscaping contractor. In the event that vegetation (e.g., trees, grass) is damaged by the removal contractor during removal activities, the removal contractor will repair or replace damaged items.

Weather permitting, the landscape contractor will landscape the property within 5 business days from the removal final inspection (Section 8.3.2).

8.2 Interior Restoration

Once VCI removal, interior cleaning, and/or interior demolition activities are complete and all necessary clearance samples are collected and meet project-specific clearance criteria, the removal contractor will begin interior restoration.

8.2.1 Attic Accesses

The removal contractor may be required to enlarge interior and/or exterior accesses, or to create new accesses to facilitate removal activities. If done, the accesses will be restored to a condition equal to that which existed before initiating the removal work, as indicated on the site-specific work plan.

8.2.2 Insulation

Insulation removed will be replaced with either blown-in or batt insulation to meet the thermal resistance value (R-value) requirements established by the 2006 International Energy Conservation Code (IECC), or its future revised requirements, adopted by the State of Montana. Insulation types and R-values will be specified in the site-specific work plans. Insulation will be installed in accordance with Section 12 of the Construction

Specifications, included in Appendix A. Installed insulation will not touch the rafters and will allow proper ventilation throughout the attic. Baffles and other accessories will be installed to allow continuous ventilation from the soffit to the roof ridge, even if soffit vents do not exist.

Prior to installing insulation in removal areas, the removal contractor is required to install double-sided cardboard attic rulers supplied by the insulation manufacturer. The removal contractor will install at least one of these rulers in a location which is visible from the area's main entrance.

Prior to installing insulation in removal areas, the removal contractor will install rigid foam baffles between all floor joists and rafters at all eave bays. The rigid foam baffles will be placed according to the manufacturer's specifications. Also prior to installing insulation in removal areas, the removal contractor will cover the top plate of the exterior walls with insulation batting in order that it prevents blown-in insulation from escaping beneath the rigid foam baffle.

After the removal contractor has installed the baffles and insulation batting, and before beginning the main installation process, they will contact A&E oversight personnel. A&E oversight will then perform a pre-insulation inspection, in order to ensure all baffles and insulation batting are installed properly and to manufacturer's specifications. Once A&E oversight personnel have performed the inspection and are satisfied with workmanship, the removal contractor will proceed to installing insulation.

If the property owner is in the process of remodeling, a credit for replacement insulation materials only may be provided to the property owner. The site-specific work plan will detail the insulation credit type and area.

The removal contractor must notify the A&E upon completion of reinsulation.

8.2.3 Interior

All moved household items will be returned to their original place (unless otherwise specified). Any holes in the walls and/or ceilings created to remove insulation or accidentally made during cleanup operations will be repaired and returned to their pre-cleanup condition, referring to the previously documented conditions and contents of the interior of the home. If carpeting is damaged, it will be professionally cleaned or may require disposal and replacement as directed by EPA.

The removal contractor will test all electrical circuits for continuity and operation to confirm that no damage was caused to electrical wiring and system components during removal work. All electrical disconnections, reconnections, and repair work must be performed by a licensed electrician. The removal contractor must provide itemized documentation of licensed electrical work to the Volpe Center or A&E H&S upon request.

8.3 Government Inspection

Throughout the restoration effort, the government representative will provide restoration oversight to ensure restoration efforts are being performed in accordance with this document and the site-specific work plan.

Once the removal contractor and A&E oversight have agreed that all restoration activities are complete, the following inspections will be performed:

- Post-cleanup inspection
- Removal final inspection

8.3.1 Post-Cleanup Inspection

The post-cleanup inspection (post-inspection) walkthrough will be performed by the government representative and CIC. Unless prior arrangements are made, post-inspections will be scheduled before 3:00 p.m. to allow adequate time to address punch list items by the removal contractor and a removal final inspection (Section 8.3.2) before returning the property to the resident.

During the post-inspection, the government representative and CIC will review the site-specific work plan to ensure all items are completed, with the exception of landscaping. The walkthrough will include a thorough documentation of the property's existing conditions so that, if necessary, post-cleanup conditions can be compared to pre-removal conditions.

Damages observed during the post-inspection and not identified during the site walkthrough at startup will be included on the punch list of items to complete before the removal final inspection. Documentation such as photographs, field notes, and pre-cleanup checklists will be referenced to determine if damages are preexisting or a result of the removal activities. If it is determined damages result from removal activities, the removal contractor will furnish all labor, equipment, and materials to repair damages to their preexisting condition.

8.3.2 Removal Final Inspection

Unless significant punch list items remain, the removal final inspection will be scheduled approximately 1 hour after the post-inspection. The removal final inspection will be attended by the government representative, removal contractor site supervisor, and CIC. The EPA field team leader may also attend the removal final inspection meeting. The purpose of the removal final inspection is to review post-cleanup site conditions and ensure that all work was conducted in accordance with the RAWP and site-specific work plan, punch list items are completed, and the property is presentable for the resident.

When the government representative decides that the property is ready, CIC will coordinate with the resident to schedule a move-in time (if applicable). CIC will then complete the activities listed in Sections 4.3.1 and 4.3.2.

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Section 9
Schedule

The removal contractor will submit a schedule to the Volpe Center for remediation work with each task order.

Schedule requests will be obtained by the A&E from the resident during the field review/ relocation meeting. Information is gathered about vacation plans, family events, and any other upcoming activities that might interfere with the scheduling of remediation activities for their property. The A&E will incorporate scheduling requests in the design submittals to the Volpe Center, for consideration in the final Request for Proposal (RFP).

The A&E and removal contractor will keep any delays in work activities as short as possible. All delays will be communicated immediately to the Volpe Center.

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Section 10
References

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_____. 2003. *Final Draft Design Analysis Report, Libby, Montana.* November.

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Appendix A

Construction Specifications

Construction Specifications

Libby Asbestos Project
Libby, Montana

Construction Specifications
Libby Asbestos Project
Libby, Montana

Table of Contents

SECTION 1

CONTROL OF WORK

1.01 MATERIALS, EQUIPMENT, AND SUPPLIES

A. The removal contractor will furnish materials, equipment, and supplies that will be efficient, appropriate, and large enough to secure a satisfactory quality of work and rate of progress and ensure the completion of the work within the time stipulated in the contract.

1.02 OTHER OR ADJACENT LAND

A. The removal contractor shall not enter or occupy other or adjacent land except by written permission of the Volpe Center and approval from the property owner.

B. Access to work areas shall be restricted to the areas shown on the site-specific work plan and/or specified herein or as directed by the Volpe Center.

1.03 CARE AND PROTECTION OF PROPERTY

A. The removal contractor shall be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the removal contractor, such property shall be restored by the removal contractor, at their expense, to a condition similar or equal to that existing before the damage was done. Specifically included are asphalt and/or concrete paved areas used by the removal contractor as work areas or access ways.

1.04 HOUSEKEEPING

A. During the course of the work, the removal contractor shall keep the site of operations in as clean and neat a condition as is possible. The removal contractor shall dispose of all contaminated and noncontaminated waste material resulting from the work and, at the conclusion of the work, shall ensure that the entire site is left in a neat and orderly condition.

B. As needed, but not less than daily, the removal contractor shall clean any portion of streets and roadways traversed by trucks hauling residential common fill, topsoil, or structural fill to the site and remove any debris or material that may have accumulated during the course of daily operations.

1.05 SITE CONTROL

A. The removal contractor shall coordinate all entrances to and exits from the work areas, and any other related matters. The removal contractor shall be responsible for protection of his facilities and equipment 24 hours per day and shall make no claim against the government. During working hours the removal contractor shall designate specific work site personnel for enforcing site control and restricting access.

B. Vehicular access to the site shall be restricted to authorized vehicles only.

C. The removal contractor shall be responsible for maintaining a log of security incidents for the duration of the work. Security incidents shall be reported to the Volpe Center immediately upon discovery.

D. The removal contractor shall keep a record of all site access and require all employees having access to the site to sign-in and sign-out.

1.06 COMMUNICATIONS

A. Provide hard-line telephone communication at removal contractor's field office.

B. Emergency numbers, including police, fire, ambulance, hospital, and all others necessary shall be prominently posted near the telephone.

C. Provide 2-way radio communication or cellular phone communication. The removal contractor shall have the ability to communicate between the field office and each active work location.

D. The removal contractor must ensure that 2-way radio communication is maintained between personnel in the Support Zone and Exclusion Zone.

1.07 EMERGENCY AND FIRST AID REQUIREMENTS

A. At least one industrial first aid kit, Model No. 8172 as manufactured by Johnson and Johnson Health Care Division or approved equal, shall be provided at each active work area and maintained fully stocked.

B. The first aid kit location(s) shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions. First aid station(s) shall be supplied with buffer solution for treating acid and caustic burns.

C. The removal contractor shall provide 20A-80 B:C type dry chemical fire extinguishers at all work sites.

D. The removal contractor shall develop a contingency plan for the following possible emergencies: hazardous materials exposure, personal injury, potential or actual fire or explosion, structural failure, and environmental accident (spill or release). In the event of any emergency associated with the site work, the removal contractor shall without delay: take diligent action to remove or otherwise minimize the cause of the emergency; treat injured persons; alert the Volpe Center and A&E H&S; and institute whatever measures might be necessary to prevent any repetition of the conditions or actions leading to, or resulting in, the emergency.

1.08 PERSONAL SAFETY AND RELATED EQUIPMENT

A. The removal contractor shall provide all onsite removal contractor personnel with appropriate PPE in accordance with the CSHASP, SSHASP, and applicable regulations. Ensure that all safety equipment and protective clothing is kept clean and well maintained or disposed of as spent contaminated waste.

B. Programs for respiratory protection shall conform to OSHA 1910.134, and hearing protection shall conform to 29 CFR 1910.95.

C. The removal contractor shall provide barricades and warning measures around openings, pits, crawl spaces, excavations, and other areas to ensure personnel protection during the work.

1.09 TRAFFIC CONTROL

A. The removal contractor shall be responsible for controlling vehicular traffic on and adjacent to the site as necessary, to ensure safe and efficient operations. All signs, flagmen, and related traffic control items shall be in accordance with State of Montana DOT requirements.

1.10 ROAD MAINTENANCE

A. All roadways, haul roads, and work areas shall be maintained in good condition throughout the progress of the work.

B. All roadways, driveways, parking areas, or sidewalks damaged or disturbed by the removal contractor's operations shall be repaired, replaced, or restored by the removal contractor to a condition similar or equal to that existing before the damage was done at no additional cost to the government.

1.11 POSTED REGULATIONS

A. The removal contractor shall develop, as required by his SSHASP, a series of posted regulations that shall be reviewed by the Volpe Center. These regulations shall address the onsite protocol regarding use of PPE, personal hygiene, and provisions regarding smoking and eating.

B. These protocols shall be posted at various prominent locations onsite and shall be reviewed with all removal contractors' personnel.

1.12 LABORATORY SERVICES

A. The A&E shall provide and coordinate the services of a qualified independent testing laboratory, approved by the Volpe Center, to perform any services and analyses necessary for the completion of the work.

B. Submit for review and approval, a detailed sampling and laboratory protocol procedure.

C. Qualifications of Laboratory

1. The laboratory shall meet the *Recommended Requirements for Independent Laboratory Qualification*, published by the American Council for Independent Laboratories.

2. The laboratory shall use U.S. Environmental Protection Agency (EPA)- and American Society for Testing Materials (ASTM)-approved methods and procedures.

3. The laboratory shall be an independent contractor.

D. The A&E shall permit the Volpe Center to perform quality control verification of sampling and analytical work. The A&E shall cooperate with the Volpe Center in obtaining samples for split analysis and shall permit the Volpe Center access to the analytical laboratory.

E. The A&E shall furnish the Volpe Center a copy of all analytical results of tests performed during the course of project work.

1.13 DAILY CLOSEOUT

A. The removal contractor's senior site representative shall attend a daily meeting with the Volpe Center. A regular time for the daily meeting shall be determined by the Volpe Center at the commencement of work.

B. The agenda of the daily meeting will include, but not be limited to, progress, regulatory compliance, health and safety, schedule, problem identification, and other issues as determined by the Volpe Center. The removal contractor shall provide a presentation of project status in accordance with the agenda determined by the Volpe Center.

1.14 LINES AND GRADES

A. The removal contractor shall be responsible for establishing lines and grades required to perform the work. The removal contractor shall cooperate with the Volpe Center, who may periodically review removal contractor compliance through the government's surveying subcontractor.

B. The removal contractor shall be responsible for performing day-to-day grade checks during placement and grading of common fill, topsoil for sodded and seeded areas, and structural fill for roadways and other locations on the property.

END OF SECTION

SECTION 2

SPECIAL PROJECT PROCEDURES

1.01 RELOCATIONS

A. The removal contractor shall be responsible for the relocation of any facilities required to perform the cleanup work.

1.02 OBSTRUCTIONS

A. The attention of the removal contractor is drawn to the fact that during excavation at the site, the possibility exists of the removal contractor encountering various water, electrical, or other lines not shown on the site-specific work plans. Exercise extreme care before and during excavation to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to an existing line, the removal contractor shall utilize a licensed tradesman to perform the repair work.

B. It is the responsibility of the removal contractor to ensure that all utility poles or other structures, the stability of which may be endangered by the close proximity of operating equipment, are fully protected.

1.03 ONSITE STORAGE

A. Materials and equipment for use in removal and restoration work shall be stored in appropriate facilities and in an appropriate manner such that they remain secure and in a condition suitable for the intended use.

1.04 EXISTING UTILITY PROTECTION

A. Approximate locations of known existing utilities are shown in the site-specific work plans for properties for which a survey was performed. Locate and protect all utilities in work areas. The removal contractor shall excavate test pits or other means, coordinated through the Volpe Center, as needed for utility location.

B. The removal contractor shall contact utility companies and U-DIG at 406-755-8344 at least 48 hours before starting construction so utility company personnel can locate their facilities.

1.05 MAINTENANCE OF EXISTING UTILITY SERVICE AND EXISTING FACILITIES OPERATION

A. The removal contractor's schedule and work shall, at all times, be subject to alteration, revision, or halted if necessary for public health and safety considerations.

B. In no case will the removal contractor be permitted to interfere with any existing utility services unless prior approval has been obtained from the Volpe Center. Work shall not begin until all materials, supplies, equipment, tools, incidentals, and engineering controls are on the job site and in place as necessary to complete the work.

C. The removal contractor shall work 24 hours per day in all cases where interferences with existing utility service may result in interruptions, health hazards, or serious inconveniences to persons served by the utilities.

1.06 SECURITY

A. The removal contractor shall provide security for the residential properties undergoing removal activities under this task order during work hours. The removal contractor shall at all times be responsible for the security of its vehicles, equipment, tools, temporary facilities, decontamination trailers, water storage tanks, portable toilets, and materials used in the removal/restoration activities.

B. The government will provide security of the residential dwellings after work hours. Government-provided, after-hours security may range from a roving security guard assigned to several residential properties within close proximity to each other or a single security guard assigned to a single residential property as determined by the government.

1.07 DAMAGE ON ACCOUNT OF HIGH WATER

A. The removal contractor shall be responsible for all damage done to their work by heavy rains or floods, and they shall take all reasonable precautions to provide against damages by building such temporary dikes, channels, or shoring to carry off stormwater, as the nature of the work may require.

1.08 EMERGENCY PHONE NUMBERS AND ACCIDENT REPORTS

A. Emergency phone numbers (fire, medical, police) shall be posted at the removal contractor's phone and its location known to all working at the site.

B. Accidents shall be reported immediately to A&E H&S by messenger or phone.

C. All accidents shall be documented and a fully detailed written report submitted to A&E H&S within 48 hours after each accident. Accident investigations shall be conducted by the removal contractor to identify the cause and ensure that the incident does not recur.

D. The emergency poster shall be posted onsite in a highly visible location for the duration of removal contractor site activities, including restoration.

1.09 WEATHER PROTECTION

A. In the event of inclement weather, the removal contractor shall protect the work and materials from damage or injury from the weather. If, in the opinion of the Volpe Center, any portion of the work or materials has been damaged by reason of failure on the part of the removal contractor to so protect the work, such work and materials shall be removed and replaced at the removal contractor's expense with new materials and work to the satisfaction of the Volpe Center. This will include freezing conditions late in the construction season.

END OF SECTION

SECTION 3

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable state and federal laws and regulations during and as the result of construction operations. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water, and land and involves management of noise and solid waste, as well as other pollutants.

C. Schedule and conduct all work in a manner that will prevent erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching, or other special surface treatments as are required to prevent silting and muddying of on-site drainage channels or streams, etc. All erosion control measures shall be in place in an area before any construction activity in that area.

D. These specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the removal contractor's responsibility to determine the specific construction techniques to meet these guidelines and maintain all such erosion control measures throughout the performance of this work.

1.02 APPLICABLE REGULATIONS

A. Comply with all applicable federal, state, and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

A. The Volpe Center will notify the removal contractor in writing of any noncompliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements may notify the removal contractor in writing directly, or through EPA or the government, of any noncompliance with state or local requirements. The removal contractor shall, after receipt of such notice from EPA or the government or from the regulatory agency, immediately take corrective action. Such notice, when delivered to the removal contractor or his/her authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the removal contractor fails or refuses to comply promptly, the Volpe Center may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost because of any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the removal contractor unless it is later determined that the removal contractor was in compliance.

1.04 IMPLEMENTATION

A. Before commencement of the work, the removal contractor shall meet with the Volpe Center to develop mutual understandings relative to compliance with this provision and administration of the environmental pollution control program as specified in this and other sections.

PART 2 EXECUTION

2.01 EROSION CONTROL

A. The removal contractor shall provide positive means of erosion control such as shallow ditches and construction filter fabric to carry off surface water. Erosion control measures such as siltation basins, hay check dams, mulching, jute netting, and other equivalent techniques shall be as specified in the site-specific work plans.

2.02 PROTECTION OF STREAMS

A. Care shall be taken to prevent, or reduce to a minimum, any damage to any onsite drainage channel or stream from pollution by debris, sediment, or other material, or from the manipulation of equipment and/or materials in or near such channels or streams.

B. All preventative measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken.

C. The removal contractor shall ensure that a hydrocarbon spill kit is onsite and available during all removal contractor site activities, including restoration.

2.03 PROTECTION OF LAND RESOURCES

A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction, that will appear to be natural and not detract from the appearance of the property. Confine all removal and restoration activities to areas shown on the site-specific work plans.

B. The removal contractor shall remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess waste materials, or any other vestiges of construction.

2.04 PROTECTION OF AIR QUALITY

A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.

B. Dust Control - The removal contractor will be required to keep all work sites free from visible dust emissions during all site activities, including restoration.

C. An approved method of stabilization consisting of water sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited, unless approved by the Volpe Center. The use of chlorides may be permitted with approval from the Volpe Center. The removal contractor shall have water trucks or other means of dust control available on site at all times.

D. Sprinkling, to be approved, must be repeated at such intervals as to prevent visible dust emissions during all site activities, including restoration, and the removal contractor must have sufficient equipment and competent staff on the job to accomplish this. Dust control shall be

performed as the work proceeds so that a dust nuisance or hazard does not occur. Polyethylene sheeting may be used as an alternative to sprinkling subject to the approval by A&E H&S.

2.05 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this contract, the removal contractor shall maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

2.06 NOISE CONTROL

A. The removal contractor shall make every effort to minimize noises caused by his/her operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with state and federal regulations.

2.07 WORK HOURS

A. Cleanup work at residential, commercial, public, and other properties shall normally be performed between 7:30 a.m. and 7:00 p.m. Any variations in work hours shall be approved in advance by the Volpe Center.

END OF SECTION

SECTION 4

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, and incidentals required to provide the following facilities:

1. Personnel decontamination facilities
2. Temporary electric power and potable water
3. Portable toilets
4. Security fence
5. Construction equipment storage area
6. Hazardous materials storage area
7. Equipment decontamination facilities
8. Temporary enclosures necessary for contamination removal
9. Local business office and equipment and materials storage area

B. The removal contractor is expressly prohibited from using permanent or semipermanent office trailers at a cleanup property. It is the removal contractor's responsibility to purchase, rent, or lease necessary local office space or office trailers with telephone, water, heat, electricity, and office equipment to perform the work of the contract.

PART 2 PRODUCTS

2.01 PERSONNEL DECONTAMINATION FACILITIES

A. Personal decontamination facilities containing a clean room, shower room, and equipment room (dirty room) shall be provided and equipped with: lockers for all personnel, potable hot and cold water, eyewash stations, and showers. It shall be a self contained portable box trailer or equivalent equipped with HEPA filtration. PPE storage shall be provided.

2.02 PORTABLE TOILETS

A. Portable toilets for male and female workers and agency personnel shall be provided and staged in the Support Zone, and workers must exit through the personnel decontamination facility to access these facilities. The removal contractor shall ensure that toilets are not used by personnel who have not undergone the decontamination process. The number of toilet seats and urinals shall be in accordance with the requirements of 20 CFR 1910.20(n)(3)(I); however, there shall be at least one portable toilet at each residential removal(s) location. Portable toilets shall be emptied and cleaned, and liquids, disinfectants, paper, etc. replaced or resupplied every other day during the removal and restoration activities.

PART 3 EXECUTION

3.01 TEMPORARY ELECTRIC POWER AND WATER

A. The removal contractor shall provide temporary electric power and potable water for use in performing this work. Potable water to be used for dust control, personnel decontamination, and other uses shall be obtained from offsite sources approved by A&E H&S. Temporary water lines shall be provided by the removal contractor, as needed. Refer to the CSHASP for water disinfection requirements.

3.02 HAZARDOUS MATERIALS STORAGE

A. Hazardous materials such as fuel, lubricating oils, and other regulated materials used by the removal contractor for work at a residential removal location shall be stored at the removal contractor's main storage facility. These materials shall not be stored at the residential removal locations.

END OF SECTION

SECTION 5

STORMWATER, SEDIMENTATION, AND EROSION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, and incidentals necessary to construct and maintain all stormwater controls as specified and required in areas of contaminated soil excavation, removal, and other earthwork. Stormwater management consists of controlling stormwater under two general conditions within the project area. The two general conditions are:

1. Direct uncontaminated run-on (from offsite) away from areas of the project that could cause contamination of the stormwater.

2. Direct potentially contaminated runoff to onsite collection systems.

B. The control of potentially contaminated site runoff is the responsibility of the removal contractor. This stormwater management work shall include controlling stormwater within the excavation areas shown on the drawings to prevent offsite transport of contaminated stormwater. The facilities to manage these stormwaters must be capable of collecting, directing, and infiltrating 100 percent of the runoff from contaminated areas produced by up to and including 1½ inches of rainfall in 24 hours.

C. The removal contractor shall provide equipment (e.g., pumps, piping, earth-working equipment) and personnel to control stormwater events. The removal contractor shall be prepared to control flows in excess of the design flows.

D. The removal contractor shall perform all installation, maintenance, removal and area cleanup related to stormwater, sedimentation and erosion control work as specified herein. The work shall include, but not necessarily be limited to installation of temporary access ways and staging areas, silt fences, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, and final cleanup.

E. Silt fences and hay bales shall be installed around excavation areas, surface waters, and other locations to prevent runoff into and out of excavation areas. Erosion controls shall be in accordance with the Montana DEQ's *Montana Sediment and Erosion Control Manual* prepared by Roxanne Lincoln, CPSS, MPDES Stormwater Program, Revised May 1996.

F. Erosion control associated with contaminated soil removal and backfilling of the site shall be the responsibility of the removal contractor.

G. Erosion control associated with revegetation of the site shall be the responsibility of the government's landscaping contractor.

1.02 REFERENCES

A. State of Montana Surface Water Quality Standard Stormwater Regulations

1.03 SUBMITTALS

A. Submit to the Volpe Center, technical product literature for all commercial products to be used for stormwater, sedimentation, and erosion control in conjunction with the Stormwater, Sedimentation, and Erosion Control Plan.

B. The removal contractor shall include in the Stormwater, Sedimentation and Erosion Control Plan stormwater control procedures that address the following items before beginning any activities that involve contaminated materials:

1. Controls to prevent stormwater from running off or running onto the property

2. Control to prevent runoff from entering or accumulating in excavations

1.04 QUALITY ASSURANCE

A. The removal contractor will be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to offsite areas or into the creek and river system via surface runoff. Measures necessary to prevent the movement of sediment offsite shall be installed, maintained, removed, and cleaned up at the expense of the removal contractor. No additional charges to the government will be considered.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed gravel for sediment filtration devices, access ways, and staging areas shall conform to applicable requirements included in the *Montana Sediment and Erosion Control Manual*, revised May 1996.

B. Silt Fence

1. Silt fence shall consist of hay bales and polypropylene fabric.

2. Hay bales shall be free from weeds banned in the State of Montana.

3. Silt fence fabric shall be a woven, polypropylene, ultraviolet resistant material such as Mirafi 100X as manufactured by Mirafi, Inc., Charlotte, North Carolina, or equal.

4. Prefabricated commercial silt fence may be substituted for built-in-field fence. Prefabricated silt fence shall be "Envirofence" as manufactured by Mirafi Inc., Charlotte, North Carolina, or equal.

PART 3 EXECUTION

3.01 GENERAL

A. Construct and maintain all berms and drainage ditches to intercept and manage stormwater as specified herein.

1. Divert runoff from running off or onto the property. Isolate and collect runoff from contaminated areas and convey it to collection facilities.

2. Divert runoff from entering into excavations. Collect runoff from excavation areas and infiltrate within the excavated areas or convey to collection facilities approved by A&E H&S.

3.02 EXCAVATION AREAS

A. Clean surface runoff flowing toward excavation areas shall be collected in shallow ditches and diverted around the perimeter of the excavation.

B. Drainage operations shall be conducted in a manner that does not cause loss of ground or disturbance to the buried pipe bedding or soil that supports overlying or adjacent structures.

3.03 CONTAMINATED MATERIAL HANDLING, STORAGE, AND TREATMENT AREAS

A. Stormwater Removal

1. Remove all accumulated stormwater as necessary to maintain safe working conditions.

B. Conveyance to Infiltration Depressions

1. Construct and maintain berms and drainage ditches for conveying runoff from the excavation, contaminated material handling, and storage areas. Provide and maintain sufficient conveyance capacity to accommodate peak flows from runoff areas to collection facilities.

C. Temporary Stormwater Storage

1. Construct and maintain collection facilities for temporary storing of runoff from contaminated areas. Provide and maintain sufficient storage capacity to store the design storm assuming 100 percent runoff. Do not divert runoff from material handling, storage, or treatment areas to the excavation area for storage.

D. Disposal of Stored Water

1. All stormwater collected from excavation areas and other contaminated areas of the property shall be disposed at the Class IV Asbestos Landfill or as directed by A&E H&S.

3.04 UNCONTAMINATED AREAS

1. Discharge stormwater from uncontaminated areas without treatment except as required by regulations and codes for sediment control. Employ best management practices (BMPs) as necessary for sediment control.

3.05 SILT FENCE INSTALLATION

A. Silt fences shall be positioned as necessary to prevent offsite movement of sediment produced by contaminated soil removal and restoration activities as directed by the A&E.

B. Dig trench approximately 4 inches deep along proposed fence lines.

C. Install prefabricated silt fence according to manufacturer's instructions.

3.06 MAINTENANCE AND INSPECTIONS

A. Inspections

1. Make a visual inspection of all stormwater, sedimentation, and erosion control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas or into the vent trench, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

B. Device Maintenance

1. Silt Fences

a. Remove accumulated sediment once it builds up to one-half of the height of the fabric.
b. Replace damaged fabric, or patch with a 2-foot minimum overlap.
c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.

3.07 REMOVAL AND FINAL CLEANUP

A. Once the property has been backfilled and the site has been fully stabilized against erosion and all other excavation and backfilling work completed, the removal contractor shall remove sediment control devices and all accumulated silt. Dispose of silt and waste materials at the mine site repository or asbestos landfill as ACM as directed by A&E H&S.

END OF SECTION

SECTION 6

ASPHALT PAVING AND SURFACING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, material, equipment testing, and incidentals required to repair all pavement disturbed by the removal contractor's operations.

B. It is the government's intention to restore streets, driveways, parking areas, or sidewalk pavements removed, damaged, or disturbed by the removal contractor's operations to a condition similar to that which existed before contaminated soil removals. Minimum replacement pavement requirements are specified herein.

1.02 SUBMITTALS

A. Submit to the Volpe Center reports showing proposed mix design and estimated Rice's density of rolled, compacted core samples for all bituminous asphalt paving materials and courses to be used on the project, along with evidence that the asphalt tack coat and other materials meet the requirements of Montana Public Works Standard Specification Section 02510.

B. Submit to the government representative a sieve analysis of recycled base material if proposed for use in this project.

1.03 REFERENCE STANDARD

A. All asphalt pavement materials and construction shall be in accordance with Montana Public Works Standard Specification Section 02510, titled Asphalt Concrete Pavement, including all addenda, except as noted and superceded by this specification.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid request shall apply.

PART 2 PRODUCTS

2.01 PAVEMENT MATERIALS

A. Bituminous asphalt concrete paving shall be as specified in Section 02510 of the above reference standard and herein:

1. Structural fill for use as subbase for asphalt driveways and other paved areas shall consist of an angular, hard, durable, processed, crushed gravel conforming to the requirements of the State of Montana Department of Transportation Standard 701.02.5 Crushed Base Course Type "B," Grade 2.

2. Structural fill shall have no particles larger than 1½ inches in largest dimension and conform to the following gradation:

Sieve Size	**Percent Finer by Weight**
1½ inches	100
No. 4	25 to 55
No. 200	0 to 8

3. Binder and surface course pavements shall be thoroughly compacted by vibratory rolling with a powered steel wheeled roller. At the removal contractor's risk, a 5-ton steel wheeled static roller may be substituted as long as the compacted thickness and compaction of 95 percent as determined by Rice's density lab testing is achieved.

4. Edges of asphalt paved areas inaccessible to the wheeled roller shall be compacted with a walk-behind vibratory plate compactor.

B. The sprinkling of water for dust control shall be provided by the removal contractor for dust suppression throughout the performance of the work. Chemical dust suppression products shall not be permitted unless approved in advance by the government representative. Removal contractor shall provide potable water for dust control.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Proof compact the exposed subgrade below areas of structural fill by at least 4 passes of a compactor before placing structural fill. Remove any soft areas and replace with structural fill.

B. Structural fill shall be placed in layers having a maximum thickness of 8 inches; loose measure, and compacted to at least 95 percent of the maximum dry density as determined by laboratory test ASTM D1557.

C. Structural fill shall extend to at least 2 feet beyond the limits of paving.

3.02 PAVING - GENERAL

A. Bituminous asphalt concrete pavement shall be installed in accordance with Section 02510 of the above reference standards.

B. Bituminous mixtures shall be placed on the approved base only when the course is sufficiently dry and weather conditions are suitable.

C. Each course shall be spread and finished as required in the referenced standard.

D. The pavement course shall be placed and compacted by steel-wheeled rollers of sufficient weight to thoroughly compact the asphalt pavement as specified above.

E. Maintain pavement during the guarantee period of 1 year and promptly refill and repave areas that have settled or are otherwise unsatisfactory for use at no additional cost to the government.

F. All pavement thicknesses referred to are compacted thicknesses. Place sufficient mix to ensure that the specified thickness of pavement is achieved wherever called for.

G. When required, remove existing pavement by saw, pneumatic hammer, or wheel, cutting edges of trenches to be repaved.

H. Hose clean all road surfaces after backfilling and before any surfacing, but in no case will pavement be placed until the gravel base is dry and compacted to at least 95 percent maximum density at optimum moisture content as specified. Removal contractor shall provide compaction test results to the government.

I. Top elevation of all subsurface utility castings including frames, grates, and utility boxes shall be set at finish grade. At no time shall castings be allowed to protrude above the finish grade of pavements or surrounding finish grades.

J. When the air temperature falls below 50 degrees Farenheit (F), extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials, and placing and compacting the mixtures.

K. No mixtures shall be placed when the air temperature is below 40 degrees F, or when the material on which the mixtures are to be placed contains frost.

L. No vehicular use or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled overnight to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to use may be extended at the discretion of the government.

M. All pavements shall be laid over a prepared subbase, thoroughly compacted as specified.

N. Where new asphalt pavement meets existing concrete sidewalks, aprons, ramps, or access roads, create straight, clean, and smooth transitions between surfaces by saw cutting and patching where necessary and matching finish grades.

O. Finish grade of all pavements shall have positive drainage. Ponds, puddles, depressed areas, or grades creating "bird baths" deeper than 1/8 inch will not be accepted, and such pavements shall be removed and reinstalled at the expense of the removal contractor.

P. Finish all edges with a neat, continuous tamped edge.

3.03 PAVEMENT SETTLEMENT

A. If points of settlement or holes appear in the pavement, the removal contractor shall repair at no additional cost to the government.

3.04 GUARANTEE/WARRANTY

A. All pavement materials placed shall be maintained over the winter and for 1 year following date of acceptance by the government. During this period, all areas that have settled or are unsatisfactory for use shall be refilled and replaced at the direction of the government.

B. All pavements, joint and filler, and pavement sealer shall be guaranteed against defects in workmanship and quality for a period of 1 year after final acceptance. Removal contractor shall repair at no cost to the government.

3.05 PAVEMENT MARKINGS

A. Reline all streets and parking areas with pavement markings equal in type and location to those existing before paving.

END OF SECTION

SECTION 7

NON-REINFORCED CONCRETE WALKWAYS AND DRIVEWAYS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, testing, and incidentals required and install concrete walkways and driveways in the locations identified in the site-specific work plans and as specified herein.

B. It is the government's intention to restore/replace residential concrete walkways and driveways damaged or removed during contaminated soil removal activities to a condition similar to that which existed before initiation of exterior removal activities.

C. Minimum requirements for non-reinforced residential concrete walkways and driveways are specified herein. The Concrete and Reinforcing Steel Section of these Construction Specifications provides requirements for replacing reinforced concrete sidewalks and other reinforced concrete items at residential, public, commercial, and industrial properties.

1.02 REFERENCE STANDARDS

A. ASTM

1. ASTM D1752 – Standard Specification for Premolded Joint Filler (Self Expanding Cork)

B. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO M213 - Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete shall be as specified in the Concrete and Reinforcing Steel Section.

B. Premolded joint filler shall be self expanding cork conforming to ASTM D1752, Type III, by A.C. Horn, Inc.; Tamms Industries of Kirkland, IL; W.R. Meadows, Hampshire, IL; or equal.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Structural fill for use as subbase for concrete driveways shall consist of an angular, hard, durable, processed, crushed gravel conforming to the requirements of the State of Montana Department of Transportation Standard 701.02.5 Crushed Base Course Type "B," Grade 2.

B. Structural fill shall have no particles larger than 1½ inches in largest dimension and conform to the following gradation:

Sieve Size	Percent Finer by Weight
1½ inches	100
No. 4	25 to 55
No. 200	0 to 8

C. Proof compact the exposed subgrade below areas of structural fill by at least 4 passes of a compactor before placing structural fill. Remove any soft areas and replace with structural fill.

D. Structural fill shall be placed in layers having a maximum thickness of 8 inches, loose measure, and compacted to at least 95 percent of the maximum dry density as determined by laboratory test ASTM D1557.

3.02 INSTALLATION

A. The subgrade for walkways shall be shaped parallel to the proposed surface of the walkways and thoroughly compacted. All depressions occurring shall be filled and again compacted until the surface is smooth and hard.

B. After the subgrade has been prepared, a structural fill base course shall be placed. After being thoroughly compacted, the base course shall be at least 8 inches in thickness and parallel to the proposed surface of the walkway.

C. Forms

1. Side and transverse forms shall be smooth, free from warp, of sufficient strength to resist springing out of shape, of a depth to conform to the thickness of the walkway, and of a type satisfactory to the Engineer.

2. All mortar or dirt shall be completely removed from forms that have been previously used. The forms shall be well staked and thoroughly braced and set to the established lines with their upper edge conforming to the grade of the finished walk, which shall have sufficient pitch to provide for surface drainage, but not to exceed ¼ inch/foot.

3. All forms shall be oiled as specified in the Concrete and Reinforcing Steel Section before placing concrete.

D. Placing and Finishing Concrete

1. Concrete walkways shall be placed in alternate slabs not exceeding 30 feet in length, except as otherwise ordered. The slabs shall be separated by transverse, preformed expansion joint filler.

2. Tooled joints shall be spaced at a 5-foot maximum.

3. Preformed expansion joint filler shall be placed adjacent to structures as directed.

4. Concrete shall be placed in such quantity that, after being thoroughly consolidated in place, it shall be 4 inches in depth. Finishing operations shall be delayed until all bled water and water sheen has left the surface and concrete has started to stiffen. After water sheen has disappeared, edging operations shall be completed. After edging and jointing operations, the surface shall be floated with an aluminum or magnesium float. Immediately following floating, the surface shall be steel troweled. Tooled joints and edges shall be rerun before and after troweling to maintain uniformity. Finish with broom at right angles to alignment of walk, then round all edges with 1/4-inch radius after brooming.

5. Sidewalk Finish: Walks adjacent to structures shall slope down ¼ inch/foot away from structures, unless otherwise shown. The surface shall be struck off by means of a strike board and floated with a wood or cork float to a true plane, then flat-steel troweled before brooming. The surface shall be broomed at right angles to the direction of traffic. Sidewalk surfaces shall be laid out as agreed to by the government and property owner.

6. Driveways, walkways, and other concrete slabs shall be constructed to slope away from structures to the grades that existed before exterior removal activities or as agreed upon between the government and property owner. All slabs shall receive a broom finish.

7. When completed, the walkways shall be kept moist and protected from traffic and weather for at least 3 days.

END OF SECTION

SECTION 8

CORRUGATED METAL PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, and incidentals required to furnish and install any corrugated metal pipe damaged during removal activities.

1.02 SUBMITTALS

A. Submit the name of the pipe supplier and a list of materials to be furnished. The submittal shall include the following:

1. Shop drawings showing layout, joint, method of manufacture and installation of pipe, and a schedule of pipe lengths.

2. Before shipment of pipe, submit certified test reports that the pipe for this project was manufactured and tested in accordance with the ASTM and American Water Works Association (AWWA) standards specified herein.

1.03 REFERENCE STANDARDS

A. ASTM

1. ASTM A444 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Storm Sewer and Drainage Pipe.

B. AWWA

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. Inspection of the pipe shall be made by the A&E at the point of fabrication or after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specified requirements, even though pipes may have been accepted as satisfactory at the place of fabrication. Pipe rejected after delivery shall be marked for identification and removed from the site.

PART 2 PRODUCTS

2.01 CORRUGATED METAL PIPE

A. The corrugated metal pipe shall be fabricated from zinc coated steel sheets conforming to ASTM A444. The pipe corrugations shall be 2b inches by ½ inch.

B. Pipe shall be fabricated with helical corrugations and a continuous lock or welded seam. The pipe and joints shall be leakproof and capable of withstanding an H-20 live load.

C. Minimum pipe gauges shall be as follows:

Pipe Diameter (inches)	Minimum Gauge
12 to 24	16
30 to 36	14
42 to 48	12

2.02 FITTINGS FOR CORRUGATED METAL PIPE

A. Joints

1. Furnish and install one- or two-piece corrugated bands that mesh with the corrugations of the pipe ends. Bands shall be tightened by bolts through steel angles built into bands. Jointing bands shall be specifically fabricated for the pipe to be used.

PART 3 EXECUTION

3.01 INSTALLATION

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or fittings and the joint surfaces. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed that is found to be defective.

B. As soon as the excavation is completed to the normal grade of the bottom of the trench, place 6 inches minimum structural fill in the trench. Pipe shall be firmly bedded in this gravel to conform accurately to the lines and grades indicated on the site-specific work plans. Blocking under the pipe will not be permitted.

C. For helically corrugated pipe, ends shall bolt together. Keep dirt and gravel out of the joint so that corrugations will fit snugly. As the jointing band is tightened, tap it with a mallet to take up slack and ensure a tight joint.

D. Holding the pipe section securely in place with jacks or come-along, place structural backfill, bringing it up evenly on both sides of the pipe. Compact the backfill as it is placed. Continue backfilling and compacting until structural fill is at mid-depth of pipe.

E. Carefully regulate the equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall promptly and satisfactorily be repaired or replaced at the removal contractor's expense.

END OF SECTION

SECTION 9

LANDSCAPING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Landscaping in areas identified in the site-specific work plans will be performed by the government's landscaping contractor. Should the removal contractor disturb or damage a landscaped area on a property that was not identified as a soil removal area, the removal contractor shall restore the disturbed or damaged landscaped area in accordance with the requirements of this Section at its expense.

B. The government's landscaping contractor will furnish all labor, materials, equipment, tools, sod, seed, plant material, supervision, and incidentals necessary for landscaping of excavation areas and other areas identified in the site-specific work plans and specified herein. The topsoil, provided by the government, will have sufficient organic matter and meet the textural and pH requirements required to support sod or seed growth. The application of pesticides will only be required when directed by the government.

C. The government's landscaping contractor will prepare the final seed bed by tilling, hand raking, and other approved methods before seeding and/or sodding. The government's landscaping contractor will furnish and install all plant materials and related work including, but not limited to, excavation, backfilling, watering, mulching, and all incidental work required to complete the landscaping of contaminated soil removal areas and other disturbed areas.

D. The government's landscaping contractor will read and understand the RAWP and CSHASP, training its personnel on the requirements within these documents.

1.02 REFERENCES

A. ARM

1. ARM 4.5.201 - 4.5.204 Noxious Weed Management

B. Agricultural Marketing Service (AMS)

1. AMS-01 (Aug 95) Federal Seed Act Regulations Part 201

C. American Nursery and Landscape Association (ANLA)

1. American National Standards Institute (ANSI)/ANLA Z60.1 (1996) Nursery Stock

D. ANSI

1. ANSI A300 (1995) Tree Care Operations - Trees, Shrubs, and Other Woody Plant Maintenance

E. Camp Dresser & McKee/Montana State University

1. (1998) Best Management Practices for Upland Reclamation Activities, Clark Fork River Basin

F. State of Montana

1. MCA 80-5-134 - Agricultural Seed Requirements

G. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only.

B. Manufacturer's Literature – Manufacturer's literature discussing physical characteristics, application, and installation instructions for equipment and surface erosion control material.

C. Equipment List - A list of proposed pesticide application, seeding, sodding, and mulching equipment to be used in performance of seeding and sodding operation, including descriptive data and calibration tests.

D. Delivery Schedule - A delivery schedule shall be provided at least 10 days before the intended date of the first delivery of any materials listed in Part 2 herein.

E. Application of Pesticide - A pesticide treatment plan with proposed sequence of pesticide treatment work shall be submitted before application of pesticide. The pesticide trade name, chemical composition, formulation, concentration, application rate of active ingredients, method of application for all materials, and the name and state license number of the state-certified applicator shall be included.

F. Certificates of compliance certifying that materials meet the requirements specified, before the delivery of materials. Certified copies of the reports for the following materials shall be included.

G. Seed - Seed origin, classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested. The government landscaping contractor shall supply the Volpe Center with all seed bag tags and a certification from the supplier stating that the seed complies with applicable local, state, and federal regulations.

H. Sod - Classification, botanical name, common name, mixture percentage of species, percent purity, quality grade, and field location. The government landscaping contractor shall supply the Volpe Center with a certification from the supplier stating that the sod complies with applicable local, state, and federal regulations.

I. Mulch - Composition and source.

J. Pesticide - EPA registration number and registered uses.

K. Plant Material - Plant material origin, classification, botanical name, common name, and size.

L. Quantity Check - Bag count or bulk weight measurements of material used compared with area covered, to determine the application rate and quantity installed.

M. Equipment Calibration Test Results - Equipment calibration test results including data and calibration records.

1.04 SOURCE INSPECTION

A. The source of seed, sod, and plant materials shall be subject to inspection by the Volpe Center.

1.05 DELIVERY, INSPECTION, STORAGE, AND HANDLING

A. Delivery

1. Sod - Sod shall be protected during delivery to prevent desiccation, internal heat buildup, or contamination.
2. Pesticides - Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

3. Plant Material Identification and Protection During Delivery - Plant material shall be identified with attached, durable, waterproof labels and weather-resistant ink, stating the correct botanical plant name and size. Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball. Branches shall be protected by tying-in. Exposed branches shall be covered during transport.

B. Inspection

1. Seed - Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date 5 months or older shall be rejected.

2. Sod - Sod shall be inspected upon arrival at the job site for conformity to species. Sod shall be checked for visible broadleaf weeds and a visible consistency with no obvious patches of foreign grasses that exceed 2 percent of the canopy. Sod that is heating up, dry, moldy, yellow, irregularly shaped, torn, or of uneven thickness shall be rejected.

3. Plant Material - Plant material shall be well shaped and vigorous with a healthy, well-branched root system, free from disease, harmful insects and insect eggs, sunscald injury, disfigurement, or abrasion. Plant material shall be checked for unauthorized substitution and to establish nursery-grown status. Plant material showing desiccation, abrasion, sunscald injury, disfigurement, or unauthorized substitution shall be rejected. The plant material shall exhibit typical form of branch to height ratio and meet the caliper and height measurements specified herein. Plant material that measures less than specified, or has been poled, topped off, or headed back shall be rejected. Container-grown plant material shall show new fibrous roots and the root mass shall contain its shape when removed from the container. Plant material with broken or cracked earth balls or broken containers shall be rejected. Unacceptable material shall be removed from the job site.

C. Storage

1. Materials shall be stored in designated areas. Seed shall be stored in cool, dry locations away from contaminants.

2. Sod shall be stored in designated areas and kept in a moist condition by watering with a fine mist and covered with moist burlap, straw, or other covering. Covering shall allow air to circulate, preventing internal heat from building up. Sod shall be protected from exposure to wind and direct sunlight until installed.

3. Plant material not installed on the day of arrival at the site shall be stored and protected in designated areas. Plant material shall not be stored longer than 30 calendar days. Plant material shall be protected from direct exposure to wind and sun. Bare-root plant material shall be heeled in. All plant material shall be kept in a moist condition by watering with a fine mist spray until installed.

D. Handling

1. Except for bulk deliveries, materials shall not be dropped or dumped from vehicles. Sod shall not be damaged during handling. Plant material shall not be injured in handling.

Cracking or breaking the earth ball of balled and burlapped plant material shall be avoided. Plant material shall not be handled by the trunk or stems.

E. Time Limitation

1. The hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours. Time limitation between harvesting and installing sod shall be a maximum 36 hours. Except for container-grown plant material, the time limitation between digging and installing plant material shall be a maximum of 90 calendar days. The time limitation between installing the plant material and placing the mulch shall be a maximum of 24 hours.

PART 2 PRODUCTS

2.01 GENERAL

A. The government landscaping contractor shall provide all materials and equipment in suitable and adequate quantity and quality as required to accomplish the work shown and specified herein.

2.02 SEED

A. Seed Classification - State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS-01 and applicable state seed laws. The following must appear on the label:

1. Lot number or other distinguishing mark.

2. The common name, genus, species (and subspecies, when applicable), including the name of each kind of seed present in excess of 5 percent. When two or more kinds of seed are named on the label, the label shall specify the percentage of each. When only one kind of seed is present in excess of 5 percent and no variety name or type designation is shown, the percentage must apply to seed of the kind named. If the name of the variety is given, the name may be associated with the seed of the kind named. If the name of the variety is given, the name may be associated with the name of the kind. The percentage in this case may be shown as pure seed and must apply only to seed of the variety named.

3. State or County of Origin.

4. The approximate percentage of viable seed, together with the date of the test. When labeling mixtures, the percentage of viability of each kind shall be stated.

5. The approximate percentage by weight of pure seed, meaning the freedom of seed from inert matter and from other seeds.

6. The approximate percentage by weight of sand, dirt, broken seeds, sticks, chaff, and other inert matter.

7. The approximate total percentage by weight of other seeds.

8. The name and approximate number of each kind of species of prohibited and restricted noxious weed seeds occurring per pound of seed.

9. The full name and address of the person, firm, or corporation selling the seed.

B. Seed Species and Mixtures

1. Seed species and mixtures shall be proportioned by weight as shown in Table 1.

Table 1
Revegetation Seed Mixture

Botanical Name	*Common Name*	*Drill Seeding*	*Broadcast Seeding*
		Pounds Pure Live Seed per Acre	
Graminoids			
Festuca ovina, var. *Covar*	Sheep fescue	0.30	0.60
Bromus marginatus, var. *Bromar*	Mountain brome	2.49	4.98
Phleum alpinum	Alpine timothy	0.16	0.32
Secale cereale	Cereal rye	3.00	6
Agrostis scabra	Ticklegrass	0.05	0.10
Agropyron riparium, var. *Sodar*	Streambank wheatgrass	1.74	3.48
Deschampsia caespitosa	Tufted hairgrass	0.10	0.20
Poa cambyi, var. *Cambar*	Canby bluegrass	0.19	0.38
Lupinus perennis	Wild lupine	4.15	8.30
Achillea millefolium	Western yarrow	0.22	0.44
Total		**12.40**	**24.80**

C. Quality

1. Per MCA 80-5-134, seed shall contain no prohibited noxious weed seed. The seed shall contain no restricted noxious weed seed in excess of the maximum numbers per pound as specified by the State of Montana or as specified by the appropriate county Weed Board, whichever is more stringent.

2. The number of seed allowed per pound for all the noxious weed seeds listed in ARM 4.5.201 through 4.5.204 shall be 0.

3. All seed shall be a standard grade adapted to Montana conditions. Seed that has become wet, moldy, or otherwise damaged shall be rejected.

4. Substitutions - Substitutions will not be allowed without written request and approval from the Volpe Center.

2.03 SOD

A. Sod Classification

1. State-certified or nursery-grown sod shall be provided as classified by applicable state laws. Sod section shall be sized to permit rolling and lifting without breaking.

B. Grass Species

1. Grass species shall be Kentucky Bluegrass (*Poa pratensis*).

C. Quality

1. Sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, woody plant roots, and other materials detrimental to a healthy stand of grass plants. Broadleaf weeds and patches of foreign grasses shall be a maximum 2 percent of the sod section.

D. Thickness

1. Sod shall be machine cut to a minimum 1-3/8 inch thickness. Measurement for thickness shall exclude top growth and thatch.

E. Anchors

1. Sod anchors shall be as recommended by the sod supplier.

F. Substitutions

1. Substitutions will not be allowed without written request and approval from the Volpe Center.

2.04 PLANT MATERIAL

A. Plant Material Classification

1. The plant material shall be nursery-grown stock conforming to ANLA ANSI/ANLA Z60.1 or locally obtained stock and shall be the species specified. Shrub and tree species must be comparable to those species removed during the reclamation; they must be of the same seasonal variety, adapted to the climate and habitat, and be native to the area. Plant material species to be used for reclamation will be specified by the Volpe Center or A&E.

B. Substitutions

1. Substitutions will not be permitted without written request and approval from the Volpe Center.

C. Quality

1. Well-shaped, well-grown, vigorous plant material having healthy and well-branched root systems in accordance with ANLA ANSI/ANLA Z60.1 shall be provided. Plant material shall be provided free from disease, harmful insects and insect eggs, sunscald injury, disfigurement, and abrasion. Plant material shall be free of shock or damage to branches, trunk, or root systems, which may occur from the digging and preparation for shipment, method of shipment, or shipment. Plant quality is determined by the growing conditions, method of shipment to maintain health of the root system, and growth of the trunk and crown as follows.

D. Growing Conditions

1. Plant material shall be native to or well suited to the growing conditions of the project site. Plant material shall be grown under climatic conditions similar to those at the project site.

E. Method of Shipment to Maintain Health of Root System

1. Balled and Burlapped (BB) Plant Material - Ball size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding root system necessary for the full recovery of the plant. The root ball shall be completely wrapped with burlap or other suitable material and securely laced with biodegradable twine.

2. Balled and Potted (Pot) Plant Material - Ball size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding root system necessary for the full recovery of the plant. The container shall be sufficiently rigid to hold ball shape and protect root mass during shipping.

3. Container-Grown (C) Plant Material - Container size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. Plant material shall be grown in a container over a duration of

time for new fibrous roots to have developed and for the root mass to retain its shape and hold together when removed from the container. The container shall be sufficiently rigid to hold ball shape and protect root mass during shipping.

F. Growth of Trunk and Crown

1. Coniferous evergreen plant material shall have the height-to-spread ratio recommended by ANLA ANSI/ANLA Z60.1. Acceptable plant material shall be exceptionally heavy, well shaped, and trimmed to form a symmetrical and tightly knit plant.

G. Plant Material Measurement

1. Plant material measurements shall be in accordance with ANLA ANSI/ANLA Z60.1.

2.05 MULCH

A. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Mulch shall be applied at a rate of 2 tons per acre.

B. Straw

1. Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition, and with a consistency for placing with commercial mulch-blowing equipment.

C. Hydromulch

1. Hydromulch may be applied to the affected areas after those areas have been seeded. Hydromulch shall not be applied simultaneously with hydroseed.

2.06 WATER

A. Water required during seed and sod bed preparation, sodding, seeding, planting, and related landscaping work shall be the responsibility of the government landscaping contractor. Unless the property owner specifically permits use of city water delivered to the property, the government landscaping contractor shall be responsible for providing all water needed for completing the work described in this Section. Water shall not contain elements or compounds toxic to plant life. Watering during establishment period shall be the responsibility of the property owner.

2.07 PESTICIDE

A. Pesticide shall be insecticide, fungicide, nematocide, rodenticide, or miticide. For the purpose of this specification, a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved.

2.08 SURFACE EROSION CONTROL MATERIAL

A. Surface Erosion Control Blanket

1. Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

B. Surface Erosion Control Fabric

1. Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4- to 1-inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

C. Surface Erosion Control Net

1. Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1-inch square.

D. Erosion Control Material Anchors

1. Erosion control anchors shall be as recommended by the manufacturer.

2.09 PLANT MATERIAL STAKING AND GUYING MATERIALS

A. Wood Staking Material

1. Wood stakes shall be hardwood or fir, rough sawn, free from knots, rot, cross grain, or other defects that would impair their strength.

2. Bracing Stake - Wood bracing stakes shall be a minimum 2-inch by 2-inch square and a minimum 8 feet long with a point at one end. Stake shall be set without damaging root ball.

3. Wood Ground Stakes - Wood ground stakes shall be a minimum of 2-inch by 2-inch square and a minimum 3 feet long with a point at one end.

B. Metal Staking and Guying Material

1. Metal shall be aluminum or steel consisting of recycled content made for holding plant material in place.

2. Bracing Stakes - Metal bracing stakes shall be a minimum 1-inch diameter and 8 feet long. Stake shall be set without damaging root ball.

3. Metal Ground Stakes - Metal ground stakes shall be a minimum 2-inch diameter and 3 feet long.

4. Earth Anchor - Metal earth anchors shall be a minimum 2-inch diameter and 2 feet long.

5. Guying Material - Metal guying material shall be a minimum 12-gauge wire. Multistrand cable shall be woven wire. Guying material tensile strength shall conform to the size of tree to be held firmly in place.

6. Turnbuckle - Metal turnbuckles shall be galvanized or cadmium-plated steel and shall be a minimum 3 inches long with closed screw eyes on each end. Screw thread tensile strength shall conform to the size of tree to be held firmly in place.

C. Plastic Staking and Guying Material

1. Plastic shall consist of recycled plastic product made for holding plant material firmly in place. Plastic shall not be used for deadmen.

2. Plastic Bracing Stakes - Plastic bracing stakes shall be a minimum 2-inch diameter and 8 feet long. Stake shall be set without damaging root ball.

3. Plastic Ground Stakes - Plastic ground stakes shall be a minimum 1-inch diameter and 3 feet long.

4. Plastic Guying Material - Plastic guying material shall be designed specifically for the purpose of firmly holding plant material in high wind velocities.
5. Chafing Guard - Plastic chafing guards shall be used to protect tree trunks and branches when metal is used as guying material. The material shall be the same color throughout all work areas. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

D. Rubber Guying Material

1. Rubber chafing guards, consisting of recycled material, shall be used to protect tree trunks and branches when metal guying material is applied. The material shall be the same color throughout all work areas. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

2.10 FLAG

A. Plastic flag material shall be used on guying material. It shall be a minimum 6 inches long. Tape color shall be consistent and visually complimentary to all work areas.

2.11 TREE ROOT BARRIERS

A. Tree root barriers shall be metal or plastic consisting of recycled content. Barriers shall use vertical stabilizing members to encourage downward tree root growth. Barriers shall limit, by a minimum 90 percent, the occurrence of surface roots. Tree root barriers that are designed to be used as plant pit liners shall be rejected.

2.12 DECORATIVE ROCK

A. Decorative rock shall consist of clean, sound, durable particles of natural gravel, crushed gravel, crushed stone, or slag. The decorative rock shall be asbestos free, typical of that used locally in landscaping applications. Decorative rock shall be free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign materials.

2.13 INERT MEMBRANE

A. Inert membrane shall consist of polyethylene that conforms to ASTM D2103, be 4 mils thick, and be black in color.

2.14 EDGING MATERIAL

A. Metal

1. Metal edging shall be galvanized steel with slots provided for stakes and shall be at least 12-guage, 10 inches wide and supplied in at least 16 foot lengths. Anchoring stakes shall be of similar material and 16 to 18 inches long and tapered.

B. Plastic

1. Plastic edging shall be 4⅝ inches deep by ¼ inch thick in 15 foot lengths.

PART 3 EXECUTION

3.01 EDGING

A. Edging materials for plant beds shall be in installed in accordance with manufacturer's recommendations. Bed size and shape shall be as indicated on the site-specific work plans.

3.02 DECORATIVE ROCK PLACEMENT

A. Decorative rock shall be placed on inert membrane in locations shown on the site-specific work plans to match the original condition. The decorative rock shall be spread evenly to a depth of 4 inches.

3.03 SEEDING TIME AND CONDITIONS

A. Seeding Time

1. Seeding shall be permitted from April 30 through October 15.

B. Seeding Conditions

1. Sloped backfilled areas finished during the period of April 30 through October 15 shall be covered and permanently seeded within this time period. The government landscaping contractor shall obtain permission from the Volpe Center before commencing growth media placement, amendment addition, and seeding. Erosion control methods shall be implemented on slopes and areas finished during the period of October 16 and April 29.

C. Equipment Calibration

1. Calibration tests shall be conducted on the equipment to be used immediately before the commencement of seeding operations. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided to the Volpe Center within 1 week of testing.

3.04 SEED BED PREPARATION

A. Finished Grade and Growth Media

1. The government landscaping contractor shall verify that finished grades have been completed as indicated on the site-specific work plans or to preconstruction grades on properties where a topographic survey was not performed.

B. Seed Bed Condition

1. It is necessary, insofar as it is practicable and feasible, as determined by the Volpe Center, that the seed bed surface, at the time of seed application, not be excessively wet, snow-covered, or frozen. The seedbed surface shall be reasonably free of large lumps, clods, and impervious crusts of growth media. The seedbed surface, to a depth of approximately 4 inches, shall not be so tightly compacted that seed cannot begin growth. The objective for the seedbed is to create a moderately rough surface.

C. Surface Preparation

1. Preparation - The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris. The growth media surface shall be filled or smoothed to remove rills, gullies, and depressions.

2. Field Area Debris - Debris and stones over a minimum 3 inches in any dimension shall be removed from the surface.

3. Protection - Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.05 SEED APPLICATION

A. Before seed application, any previously prepared surface compacted or damaged shall be reworked. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

B. Seed Installation

1. The seeding method shall be approved by the Volpe Center. The seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved by the Volpe Center. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

2. Broadcast Seeding - Seed shall be uniformly broadcast at the rate specified in Table 1 using broadcast seeders. Half the total rate of seed application shall be broadcast in one direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 3-inch depth by disk harrow, steel mat drag, cultipacker, or other approved device.

3. Drill Seeding - Seed shall be uniformly drilled to a maximum 2-inch depth and at the rate specified in Table 1 using equipment having drills a maximum 7 inches distance apart. Row markers shall be used with the drill seeder. Half the total rate of seed application shall be drilled in one direction, with the remainder of the seed rate drilled at 90 degrees from the first direction. The drilling equipment shall be maintained with half-full seed boxes during the seeding operations.

4. Hydroseeding - Seed shall be added to water and thoroughly mixed to meet the seed mixture specified in Table 1. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

5. Rolling - The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1-vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled. Hydroseeded areas shall not be rolled.

C. Mulching

1. Straw Mulch - Straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

2. Mechanical Anchor - Mechanical anchor shall be a V-type-wheel land packer, a scalloped-disk land packer designed to force mulch into the soil surface, or other suitable equipment.

3. Wood Cellulose Fiber, Paper Fiber, and Recycled Paper - Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

D. Watering Seed

1. Residential Area Landscaping - The government landscaping contractor shall begin watering immediately after completing seeding of an area. The government landscaping

contractor shall water seeded and landscaped areas for 7 days, the property owner will be responsible for watering the seeded area thereafter.

3.06 SODDING TIME AND CONDITIONS

A. Sodding Time

1. Sodding shall be permitted from April 30 through October 15.

B. Sodding Conditions

1. Sodding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed by the Volpe Center. When special conditions warrant a variance to the sodding operations, proposed alternate times shall be submitted for approval to the Volpe Center.

C. Equipment Calibration

1. Calibration tests shall be conducted on the equipment to be used immediately before the commencement of sodding operations. These tests shall confirm that the equipment is operating within manufacturer specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided to the Volpe Center within 1 week of testing.

3.07 SOD BED PREPARATION

A. Finished Grade and Growth Media

1. The government landscaping contractor shall verify that finished grades have been completed as indicated on the site-specific work plans, and the placing of growth media, smooth grading, and compaction requirements have been completed, before the commencement of the sodding operation.

B. Sod Bed Condition

1. It is necessary, insofar as it is practicable and feasible, as determined by the Volpe Center, that the sod bed surface, at the time of sod placement, not be excessively wet, snow-covered, or frozen. The sod bed surface shall be reasonably free of large lumps, clods, and impervious crusts of growth media. The sod bed surface, to a depth of approximately 4 inches, shall not be so tightly compacted that sod cannot continue growth. The objective for the sod bed is to create a moderately rough surface.

C. Surface Preparation

1. Preparation - The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris. The growth media surface shall be filled or smoothed to remove rills, gullies, and depressions.

2. Field Area Debris - Debris and stones over a minimum 1 inch in any dimension shall be removed from the surface.

3. Protection - Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.08 SOD INSTALLATION

A. Before installing sod, any previously prepared surface compacted or damaged shall be reworked. Areas shall be sodded in the areas shown on the site-specific work plans. Adequate soil moisture shall be ensured before sodding by spraying water on the area to be sodded and wetting the soil to a maximum 1-inch depth.

B. Sod Placement

1. Rows of sod sections shall be placed parallel to and tightly against each other. Joints shall be staggered laterally. The sod sections shall not be stretched or overlapped. All joints shall be butted tight. Voids and air drying of roots shall be prevented. Sod sections shall be laid across the slope on long slopes. Sod sections shall be laid at right angles to the flow of water in ditches. Sod sections shall be anchored on slopes steeper than 3-horizontal-to-1-vertical. Anchoring may be required when surface weight or pressure upon placed sod sections is anticipated to cause lateral movement. Sod anchors shall be placed a minimum 2 feet on center with a minimum of two anchors per sod section.

C. Finishing

1. Displacement of the sod shall be prevented by tamping or rolling the sod in place and knitting the sod to the soil. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed, and holes or missing corners shall be patched with sod.

D. Rolling

1. The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled.

E. Watering Sod

1. Watering shall be started immediately after completing each day of sod placement. The government landscaping contractor shall water for 7 days after completion of sod placement. The property owner will be responsible for watering the sodded area thereafter.

3.09 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

A. Deciduous Plant Material Time

1. Deciduous plant material shall be installed at times and under conditions recommended by the nursery.

B. Evergreen Plant Material Time

1. Evergreen plant material shall be installed at times and under conditions recommended by the nursery.

C. Plant Material Conditions

1. Planting operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, frozen ground, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted for approval.

3.10 SITE PREPARATION FOR PLANT MATERIAL

A. Layout

1. Plant material locations and bed outlines shall be staked on the work area before any planting is made. Plant material locations may be adjusted, if approved by the Volpe Center, to meet field conditions.

B. Protecting Existing Vegetation

1. Existing vegetation shall be protected in accordance with the agreement between the government and property owner. Any damaged vegetation that was supposed to be protected by the removal contractor during excavation and restoration activities shall be replaced by the removal contractor in accordance with this specification at no additional cost to the government.

3.11 EXCAVATION FOR PLANT MATERIAL INSTALLATION

A. Plant pits for balled and burlapped or container-grown plant material shall be dug to a depth equal to the height of the root ball as measured from the base of the ball to the base of the plant trunk. Plant pits for bare-root plant material shall be dug to a depth equal to the height of the root system. Plant pits shall be dug a minimum 50 percent wider than the ball or root system to allow for root expansion. The pit shall be constructed with sides sloping towards the base as a cone, to encourage well-aerated soil to be available to the root system for favorable root growth. Cylindrical pits with vertical sides shall not be used.

3.12 PLANT MATERIAL INSTALLATION

A. Setting Plant Material

1. Plant material shall be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. In relation to the surrounding grade, the plant material shall be set even with the grade at which it was grown.

B. Backfill Procedure

1. Before backfilling, all metal, wood, synthetic products, or treated burlap devices shall be removed from the ball or root system avoiding damage to the root system. The backfill procedure shall remove air pockets from around the root system. Additional requirements are as follows:

2. Balled and Burlapped and Balled and Platformed Plant Material - Biodegradable burlap and tying material shall be carefully opened and folded back from the top a minimum 1/3 depth from the top of the root ball. Backfill mixture shall be added to the plant pit in 6-inch layers with each layer tamped.

3. Container-Grown and Balled and Potted Plant Material - The plant material shall be carefully removed from containers that are not biodegradable. Before setting the plant in the pit, a maximum 1/4 depth of the root mass, measured from the bottom, shall be spread apart to promote new root growth. For plant material in biodegradable containers, the container shall be split before setting the plant with container. Growth media mixture shall be added to the plant pit in 6-inch layers with each layer tamped.

4. Earth Berm - An earth berm, consisting of growth media soil mixture, shall be formed with a minimum 4-inch height around the edge of the plant pit to aid in water retention and to provide soil for settling adjustments.

C. Watering

1. Plant pits shall be watered immediately after backfilling, until completely saturated.

D. Staking and Guying

1. Staking shall be used when trees are unstable or will not remain set because of their size, shape, or exposure to high wind velocity.

E. Pruning

1. Pruning shall be accomplished by trained and experienced personnel. The pruning of trees shall be in accordance with ANSI A300. Only dead or broken material shall be pruned from installed plants. The typical growth habit of individual plant material shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead, and broken branches shall be removed. Cuts at right angles to the line of growth will not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or topped off.

F Flags

1. A flag shall be securely fastened to each guy line equidistant between the tree and the stake, deadmen, or earth anchor.

3.13 SURFACE EROSION CONTROL

A. Surface Erosion Control Material

1. Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

B. Temporary Seeding

1. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with seed species listed under Paragraph 2.02 herein.

3.14 QUANTITY CHECK

A. For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.15 APPLICATION OF PESTICIDE

A. When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted.

B. Application

1. A state-certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended since it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Before each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately.

END OF SECTION

SECTION 10

CONCRETE AND REINFORCING STEEL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, and incidentals required and install all concrete work complete as shown on the site-specific work plans and as specified herein.

B. It is the intention of the government to replace/restore reinforced concrete sidewalks, driveways, walkways, and other concrete pavements removed or damaged during contaminated soil removals at residential and other properties to a condition similar to that which existed before initiation of exterior removal activities.

1.02 SUBMITTALS

A. Submit shop drawings and product data. Submittals shall include the following:

1. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cement ratio, type and manufacturer of cement.

2. Bar placement drawings and bar bending details in conformity with the recommendations of American Concrete Institute (ACI) 315.

3. Technical data on all materials and components.

4. Material Safety Data Sheets (MSDS) for all concrete admixtures and curing agents used in the concrete.

5. A concrete placement plan showing proposed locations of construction joints and a description of the contractor's proposed methods of concrete placement. The plan shall address cold or hot weather concrete procedures as appropriate. The plan shall describe the work force and equipment the contractor plans to use to place, screed, and finish each high early strength concrete placement.

B. Test Reports

1. Sieve analysis of fine and coarse aggregates.

2. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cement ratio, type and manufacturer of cement, and either a. or b. below.

   a. Standard deviation data for each proposed concrete mix based on statistical records.

   b. Water-cement ratio curve for each proposed concrete mix based on laboratory tests. Give average cylinder strength test results at 7 days for laboratory concrete mix designs. Provide results of 3-, 7- and 28-day tests if available.

C. Certifications

1. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.

1.03 REFERENCE STANDARDS

A. ASTM

1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
4. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
5. ASTM C33 - Standard Specification for Concrete Aggregates
6. ASTM C94 - Standard Specification for Ready-Mixed Concrete
7. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
8. ASTM C150 - Standard Specification for Portland Cement
9. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
12. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete
13. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
14. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

B. ACI

1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
2. ACI 301 - Standard Specification for Structural Concrete
3. ACI 305R - Hot Weather Concreting
4. ACI 306R - Cold Weather Concreting
5. ACI 315 - Details and Detailing of Concrete Reinforcement
6. ACI 318 - Building Code Requirements for Structural Concrete

C. Concrete Reinforcing Steel Institute (CRSI)

1. MSP - Manual of Standard Practice

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the government representative may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the removal contractor's expense.

B. Reinforced concrete shall comply with ACI 318.

C. All testing and inspection services required, unless otherwise specified, shall be provided and paid for by the government. Testing necessary to establish the concrete mixes shall be performed by and at the expense of the removal contractor. Methods of testing shall comply with the latest applicable ASTM standards.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Reinforcing steel shall be shipped and stored with bars of the same size and shape, fastened bundles with durable tags, marked in a legible manner with waterproof markings showing the same designations as shown on the submitted placing drawings. Reinforcing steel shall be free from mill scale, loose rust, dirt, grease, or other foreign matter. Reinforcing steel shall be stored off the ground and protected from moisture, dirt, oil, or other injurious contaminants.

B. Products shall be stored in conformity with the manufacturer's recommendations.

C. Sand, aggregates, and cement shall be stored or stockpiled in conformity with the recommendations of ACI 301.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. Like items of materials shall be the end products of one manufacturer to provide standardization for appearance, maintenance, and manufacturer's service.

C. Materials shall comply with this Section and any applicable state or local requirements.

2.02 MATERIALS

A. Cement shall be domestic portland cement conforming to ASTM C150. The allowable types of cement for each concrete class are shown in Table 1. Air-entraining cements shall not be used.

B. Fine aggregate shall be washed inert natural sand conforming to the requirements of ASTM C33.

C. Coarse aggregate shall be a well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33, size 67. Limits of Deleterious Substances and Physical Property Requirements shall be as recommended for severe weathering regions.

D. Water shall be potable, clean, and free from injurious amounts of oils, acids, alkalis, organic matter, or other deleterious substances.

E. Concrete admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.

1. Air-entraining admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

2. Water-reducing admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

3. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the government representative. When allowed, the admixtures shall be retarding or accelerating water reducing admixtures.

F. Reinforcing steel bars shall be deformed, intermediate grade, steel conforming to ASTM A615 Grade 60.

G. Welded steel wire fabric shall conform to ASTM A185 and shall be of the size and gauge shown on the detail at the end of this Section.

H. Tie wires for reinforcing steel shall be 16 gauge or heavier, black annealed wire.

I. Precast concrete block bar supports shall conform to CRSI – MSP for Precast Concrete Bar Supports.

J. Premolded joint filler shall be self-expanding cork, conforming to ASTM D1752, Type III. The thickness shall be ¾ inch unless shown otherwise on the site-specific work plans.

K. Sealant shall be a traffic-grade, polyurethane, elastomeric sealant conforming to ASTM C920 and shall be Sikaflex 2c NS TG by Sika Corporation, Lyndhurst, New Jersey, or equal.

2.03 MIXES

A. Select proportions of ingredients to meet the design strength and materials limits specified in Table 1 and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture that will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

B. The design of each mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if not available, be developed by independent testing laboratory acceptable to the government representative engaged by and at the expense of the removal contractor. Acceptance of mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318. Acceptance of mixes based on laboratory tests shall be based on strengths greater than the specified design strengths specified in Table 1. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strength. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content specified in Table 1.

C. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the compression strength requirements in conformity with the above paragraph.

D. Entrained air, as measured by ASTM C231, shall be as shown in Table 1.

E. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 1.

F. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

Table 1

Class	Design Strength (1)	Cement. ASTM C150	Cement Content (2)	W/C (3)	WR (4)	Slump Range Inches
C	3500	Type II	540	0.45 max.	Yes	3-5

All concrete classes shall have 3.5 to 5 percent air entrainment.

Notes:

(1) Minimum compressive strength at 7 days
(2) Minimum cement content in pounds/cubic yard
(3) W/C is water to cement ratio
(4) WR is water reducing admixture

2.04 MEASURING, BATCHING, MIXING, AND TRANSPORTING CONCRETE

A. Measuring, batching, mixing, and transporting concrete shall conform to ASTM C94 and the requirements herein, or as otherwise approved in writing by the government representative.

B. Ready-mixed concrete, whether produced by a concrete supplier or the removal contractor, shall conform to the requirements above. No hand mixing will be permitted.

C. Admixtures shall be dispensed into the batch in conformity with the recommendations of the manufacturer of the admixtures.

D. Concrete shall be mixed until there is uniform distribution of the materials and shall be discharged completely before the mixer is recharged. The mixer shall be rotated at a speed recommended by the mixer manufacturer and mixing shall be continued for at least 1½ minutes after all the materials are in the mixer. Concrete shall be placed within 1½ hours of the time at which water was first added, otherwise it shall be rejected. Concrete that has been remixed or retempered, or to which an excess amount of water has been added, shall also be rejected.

2.05 FORMS

A. Forms shall be free from roughness and imperfections, substantially watertight, and adequately braced and tied to prevent motion when concrete is placed. No wooden spreaders will be allowed in the concrete.

B. Wire ties will not be allowed. Metal ties or anchorages that are necessary within the forms shall be so constructed that the metal work can be removed for a depth of at least 1 inch from the surface of the concrete without injury to such surface by spalling or otherwise. Forms shall be thoroughly cleaned before using and shall be treated with oil or other approved material.

C. All exposed edges of the finished concrete shall be chamfered ¾ inch.

PART 3 EXECUTION

3.01 REINFORCING STEEL

A. Reinforcing steel shall be accurately fabricated to the dimensions shown. Bars shall be bent around a revolving collar having a diameter of not less than that recommended in ACI 318. All bars shall be bent cold.

B. Unless otherwise shown, splices in reinforcing steel shall be lapped in conformity with ACI 318 but not less than 24 diameters. All bar splices shall be staggered wherever possible. When splicing bars of different diameters, the length of lap is based on the larger bar.

C. Splices in welded wire fabric shall be lapped not less than 1½ courses or 12 inches, whichever is greater. Wire fabric splices shall be tied together with wire ties spaced no more than 24 inches on center. Furnish and install rubber tipped supports to hold wire fabric in the center of the slab.

D. Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill and rust scale, dirt and other coatings, including ice, that reduce or destroy bond. Where there is a delay in depositing concrete after the reinforcement is in place, bars shall be reinspected and cleaned when necessary.

E. Reinforcement that is to be exposed for a considerable length of time after being placed shall be given a heavy coat of cement grout.

F. In no case shall any reinforcing steel be covered with concrete until the amount and position of the reinforcements have been checked and permission given to proceed by the government representative.

3.02 INSPECTION AND COORDINATION

A. The batching, mixing, transporting, placing and curing of concrete shall be subject to the inspection of the government representative at all times. The removal contractor shall advise the government representative of his/her readiness to proceed at least 24 hours before each concrete placement. The government representative will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel, and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the government representative.

3.03 CONCRETE APPEARANCE

A. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected.

B. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability, and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete when viewed in good lighting from 10 feet away shall be pleasing in appearance and at 20 feet shall show no visible defects.

3.04 PLACING AND COMPACTING

A. No concrete shall be placed until forms, condition of subgrade, and method of placement have been approved by the government representative. Before depositing concrete, all debris, foreign matter, dirt, and water shall be removed from the forms. The contact surface between concrete previously placed and new concrete shall be cleaned and brushed with cement paste. Concrete, except as indicated on the site-specific work plans, shall not be placed in water or submerged within 24 hours after placing, nor shall running water be permitted to flow over the surface of fresh concrete within 4 days after its placing.

B. Deposit concrete as near its final position as possible to avoid segregation as a result of rehandling or flowing. Pumping of concrete will be permitted when an approved design mix and aggregate sizes, suitable for pumping, are used. Do not deposit concrete that has partially hardened or has been contaminated by foreign materials. If the section cannot be placed continuously, place construction joints as specified or as approved. Place concrete for walls using tremie tubes in 12- to 24-inch lifts, keeping the surface horizontal. Do not drop concrete more than 4 feet.

C. High frequency mechanical vibrators shall be used to the extent necessary to obtain proper consolidation of the concrete, but not to move or transport concrete in the forms. Care shall be taken to avoid segregation of aggregates by excess vibration. Vibration shall continue until the frequency returns to normal, trapped air ceases to rise, and the surface appears liquefied, flattened, and glistening. Concrete adjacent to forms and around pipe stubs shall be carefully spaded or rodded.

3.05 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. All concrete shall be cured in conformity with ACI 301. Concrete shall be water cured. Water curing shall be by ponding, by continuous sprinkling, or by covering with continuously saturated burlap. Other concrete shall be cured by either water curing, sheet material curing, or liquid membrane curing compound except that liquid membrane curing compound shall not be used on any concrete surface where additional concrete is to be placed or where the concrete surface is to be coated or painted.

C. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

D. Cold Weather Concreting

1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 degrees F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight.

2. Cold weather concreting shall conform to ACI 306.1 and the additional requirements specified herein. Temperatures at the concrete placement shall be recorded at 12-hour intervals (minimum).

3. Discuss a cold weather work plan with the government representative. The discussion shall encompass the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing, and temperature monitoring of the concrete. The procedures to be implemented upon abrupt changes in weather conditions or equipment failures shall also be discussed. Cold weather concreting shall not begin until the work plan is acceptable to the government representative.

4. During periods of cold weather, concrete shall be protected to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree-days of curing.

   a. Degree-days are defined as the total number of 24-hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g., 5 days at an average 70 degrees F = 350 degree-days).

   b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 degrees F as 0 degrees F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.

5. Salt, manure, or other chemicals shall not be used for protection.

6. The protection period for concrete being water cured shall not be terminated during cold weather until at least 24 hours after water curing has been terminated.

E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity, and wind velocity that produces a rate of evaporation estimated in accordance with ACI 305R, approaching or exceeding 0.2 pounds/square foot/hour).

2. Concrete placed during hot weather shall be batched, delivered, placed, cured, and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.

   a. Temperature of concrete being placed shall not exceed 90 degrees F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set, or cold joints.

   b. All necessary precautions shall be taken to promptly deliver, to promptly place the concrete upon its arrival at the job, and to provide vibration immediately after placement.

   c. The government representative may direct the removal contractor to immediately cover concrete with plastic sheet material.

3. Discuss with the government representative a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Hot weather concreting shall not begin until the work plan is acceptable to the government representative.

3.06 FIELD TESTS

A. Sets of four field control cylinder specimens will be taken by the government representative during the progress of the work, in compliance with ASTM C31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set, nor less than one set for each 150 cubic yards of concrete, nor less than one set for each 5,000 square feet of surface area for slabs or walls. One cylinder shall be broken at 3 days, one cylinder at 7 days and two cylinders shall be reserved for additional testing at 28 days or as determined by the government representative. When the average 7-day compressive strength of the cylinders in any set falls below the specified compressive strength or below proportional minimum 7-day strengths (where proper relation between 7- and 28-day strengths have been established by tests), the government representative may reject the concrete represented by the set of cylinders, may require modification of the concrete and/or require modification of the proportions, water content, or temperature conditions of the design mix to achieve the required strengths.

B. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through his/her operations, and furnishing material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the government.

C. Slump tests will be made in the field by the government representative in conformity with ASTM C143.

D. Tests for air content shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173.

3.07 STRIPPING AND FINISHING CONCRETE

A. Forms shall not be stripped before the concrete has attained a strength of at least 30 percent of the specified design strength, unless otherwise approved by the government representative. This is equivalent to approximately "100 day-degrees" of moist curing.

B. Care shall be exercised to prevent damaging edges or obliterating the lines of chamfers, rustications, or corners when removing the forms or doing any other work adjacent thereto.

C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.

D. As soon as forms have been stripped, form ties (if employed) shall be removed and the recess filled to ensure complete watertightness. Any defects in the surface of the walls shall be chipped out and repaired in a workmanlike manner. Defective concrete, where it occurs, shall be cut to a minimum depth of 1 inch, thoroughly roughened, and neat cement brushed in. The hole shall then be filled with mortar in the proportion of 1 part cement and 2½ parts sand with a minimum of water. Mortar for filling form tie recesses shall be mixed to a slightly damp consistency (just short of "balling"), pressed into the recess until dense, and troweled smooth. Mortar in larger patches shall be applied and allowed to assume a partial set following which it shall be struck off flush with the adjoining surface. Patches shall be kept moist for several days to assure proper curing.

E. Top surface of slabs shall be screeded to the established grades and shall be a true plane with a tolerance of 1/8 inch when checked with a 10-foot straightedge. The surface shall be finished to give a smooth, hard, even surface free from high or low spots or other defects. Concrete shall be given a broom finish. Failure to meet the condition shall be cause for removal, grinding, or other approved correction.

F. Concrete Finishes

1. All concrete walkways, driveways, and sidewalks shall receive a broom finish.

2. Screed slabs with straightedges to the original grades. When the concrete has stiffened sufficiently to maintain small surface indentations, draw a stiff bristle broom lightly across the surface in the direction of drainage, or, in the case of walks and stairs, perpendicular to the direction of traffic to provide a nonslip surface.

END OF SECTION

SECTION 11

CARPENTRY WORK

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Carpentry work required to restore wood decks, patios, fences, etc. identified in the RAWP and/or shown on the site-specific work plans, or demolition and reconstruction to complete soil excavation, shall be completed as specified in this Section.

B. Wood decks, patios, fences, or any part of a wood structure not identified for removal and reinstallation or demolition and replacement in kind but damaged by the removal contractor during soil excavation, backfilling, and related activities, shall be restored to a condition similar to that which existed before removal activities as specified in this Section at the removal contractor's expense.

C. Carpentry work required to restore access openings to a condition that existed before removal activities, or to finish access openings as permanent access ports in ceilings, walls, and other locations shall be completed as specified in this Section. Access opening may be required in ceilings, walls, and other locations to complete VCI removal.

D. When carpentry work is required, the removal contractor shall furnish all labor, materials, equipment, and incidentals required to install all items of rough and finish carpentry work required as specified herein.

1.02 SUBMITTALS

A. Submit complete shop drawings showing details of fabrication and erection of all carpentry items and material furnished under this Section.

B. Provide samples of materials proposed for restoration/repair of interior walls, ceilings, floors, etc. and exterior siding for evaluation and approval by the government and property owner before initiation of interior removal work.

1.03 REFERENCE STANDARDS

A. American Wood Preservers Association (AWPA)

1. AWPA P5 - Waterborne Preservatives

B. National Electrical Manufacturers Association (NEMA)

1. NEMA LD3 - High-Pressure Decorative Laminates

C. Architectural Woodwork Institute (AWI)

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. For finish carpentry items, comply with the specified provisions of the *Architectural Woodwork Quality Standards' Illustrated* of the AWI Premium Grade Standards.

PART 2 PRODUCTS

2.01 MATERIALS - ROUGH AND FINISH CARPENTRY

A. All lumber shall be of sound stock, delivered dry, and shall be fully protected at all times from injury and dampness. Split, broken, or otherwise damaged pieces will not be allowed in the work.

B. Wood for blocking and nailers shall be seasoned, 19 percent maximum moisture content, construction grade quality and of Douglas fir, hemlock-fir, southern pine, or ponderosa pine species.

1. Wood members that will contact masonry or concrete shall be vacuum-pressure treated with 100 percent oxide pure chromated copper arsenate meeting AWPA P-5. Minimum net retention of solid preservative shall be 0.40 pounds/cubic foot.

2. All treatment shall be performed in accordance with the requirements of AWPA for treating wood. Apply a heavy coat of the same preservative used in treating to all surfaces cut after treatment.

C. Nails, spikes, bolts, nuts, and washers where sizes are not indicated or specified, shall be of suitable size and number as approved to securely fasten and hold members in place. Hot dip galvanize after fabrication.

PART 3 EXECUTION

3.01 FABRICATION - ROUGH AND FINISH CARPENTRY

A. Before proceeding with fabrication of work required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit.

B. Employ only carpenters experienced in the fabrication and installation of items to be installed.

3.02 INSTALLATION

A. All rough and finish carpentry shall be accurately cut, fitted, and installed to match existing.

B. Anchors shall be installed, where indicated or required, to anchor carpentry or other items securely to masonry or concrete.

C. Provide all miscellaneous wood formwork as may be required for the completion of concrete work.

D. Install carpentry work in a manner consistent with quality of specified grade to be plumb, level, true, and straight with no distortions.

3.03 ACCEPTANCE CRITERIA

A. Upon completion of the carpentry work, the A&E will conduct a property inspection and determine if the materials used in the restoration work are equivalent to those that existed before providing access to removal areas.

END OF SECTION

SECTION 12

INSULATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The work of this section includes insulating attics, knee walls, exterior walls, and other locations identified in the site-specific work plans.

B. Insulation installation shall not begin until the area to be insulated has been clearance sampled and the EPA clearance criteria are met.

C. The removal contractor will furnish and install all blown-in insulation, batt type insulation, ventilation materials, and related work necessary to provide a complete insulation of the areas in the structure from which VCI has been removed.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site in original sealed containers or packages, each bearing manufacturer's name and brand designation, referenced specification number, type, and class, as applicable; recommended method of installation (pneumatic or pouring); minimum net weight of insulation; coverage charts; and R-values.

B. Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

1.03 SAFETY PRECAUTIONS

A. The removal contractor must ensure that personnel are trained in and use appropriate health and safety precautions during installation.

B. Do not smoke during installation of loose fill thermal insulation.

C. Consider other safety concerns and measures as outlined in ASTM C 930.

PART 2 PRODUCTS

2.01 LOOSE FILL INSULATION

A. In general, loose fill (blown-in) fiberglass insulation will be used in attics and exterior walls as described in the site-specific work plans.

B. Loose-fill (blown-in) fiberglass insulation shall be Type 1 as described in ASTM C764. Surface burning characteristics shall meet the requirements of ASTM E84 with a flame spread of 5 and a smoke developed of 5. Blown-in type shall be noncombustible as per ASTM E136.

C. Loose fill insulation shall be ProPink Complete Blown-in Wall System as manufactured by Owens Corning, Attic Protector or Climate Pro as manufactured by Johns Manville, InsulSafe 4 Fiber Glass Blowing Insulation or Optima Loose Fill Fiber Glass Insulation for Sidewall Reinsulation as manufactured by CertainTeed, or equal.

2.02 FIBERGLASS BATT INSULATION

A. Fiberglass batt insulation shall be used in specific locations identified in the site-specific work plans.

B. Batt type fiberglass insulation shall be provided in the width and thickness necessary to fit firmly between ceiling joists, floor joists, or wall studs without slippage. Fiberglass batt insulation shall be provided with or without kraft facing, as agreed upon between the government and the property owner. Fiberglass batt insulation shall meet Building Officials and Code Administrators (BOCA) building code standards, ASTM C665 material standards, and ASTM C518 for thermal performance. Unfaced fiberglass batt insulation shall comply with ASTM E84 for fire resistance with a maximum flame spread index of 25 and a maximum smoke developed index of 50.

C. Fiberglass batt insulation shall be ProPink FastBatt Fiberglass Insulation as manufactured by Owens Corning, Kraft-Faced Thermal and Acoustical Fiber Glass Insulation as manufactured by Johns Manville, Kraft-Faced Fiber Glass Building Insulation as manufactured by CertainTeed Corporation, or equal.

2.03 R-VALUES

A. Attic floors, attic-within-attic areas, kneewall flooring, etc. shall have a minimum insulation R-value in compliance with the 2006 IECC, or its future revised requirements, adopted by the State of Montana.

B. Walls shall be insulated to the full width of the wall cavity, with an R-value to match.

C. Crawl spaces, basements, etc. shall have a minimum insulation R-value in compliance with the 2006 IECC, or its future revised requirements, adopted by the State of Montana.

D. In the event that the insulation removed from the attic has an R-value greater than the 2006 IECC, or its future revised requirements, adopted by the State of Montana requires, the removal contractor will restore the attic using an insulation amount to match the R-value removed.

2.04 PROHIBITED MATERIALS

A. ACM

B. Urea Formaldehyde containing materials

C. Ammonium Sulfate containing material

2.05 SILL SEALER INSULATION

A. Sill sealer insulation, if required, shall meet the requirements of ASTM C 665, Type I.

2.06 BAFFLES

A. Baffles shall be wood, metal, or unfaced mineral fiber blanket material in accordance with ASTM C 665, Type I. Blocking to prevent blown-in insulation from obstructing roof ventilation shall be Johns Manville AP Foil-Faced Polyisocyanurate Foam Sheathing or equal.

B. Provide only noncombustible materials based on determination by ASTM E136 for blocking around chimneys and heat producing devices.

C. Provide rigid foam baffles and other accessories from the blocking manufacturer that allow continuous ventilation from the soffit to the roof ridge.

2.07 VAPOR RETARDER

A. In encapsulated areas where there had been a vapor retarder before VCI removal, the removal contractor will install a vapor retarder. The vapor retarder will meet the following specifications:

1. 6-mil thick polyethylene sheeting conforming to ASTM D4397 and having a water vapor permeance of 0.20 perm or less when tested in accordance with ASTM E96, or equivalent material approved by the A&E.

2.08 PERIMETER INSULATION

A. Rigid perimeter insulation shall be installed on the exterior of foundation and basement walls where existing insulation was removed or damaged during contaminated soil removal.

B. Perimeter insulation shall be 2-inch extruded closed cell polystyrene foam board with integral high density skins of same material. Insulation shall have a K factor of 0.20 at 75 degrees F and 0.18 at 40 degrees F. Density shall be 1.7 pounds/ft^3 maximum with a compressive strength of 20 pounds per square inch (psi) minimum. Water absorption shall be 0.7 percent maximum with a water vapor transmission of 0.6 perm-in maximum. Rigid insulation shall be waterproof and non-water absorbing. Rigid insulation shall be Styrofoam Brand Insulation as manufactured by the Dow Chemical Company or approved equal.

PART 3 EXECUTION

3.01 EXISTING CONDITIONS

A. Before installing insulation, confirm with the government representative that all areas of the attic, walls, knee walls, or other locations from which VCI has been removed have passed clearance testing. If moisture or other conditions are found that do not allow the workmanlike installation of the insulation, do not proceed but notify the government representative immediately of such conditions.

3.02 PREPARATION

A. Baffles at Attic Vents and Access Doors

1. Before installation of blown-in insulation, install permanent baffles to prevent insulation from covering, clogging, or restricting air flow through soffit vents at building eaves. Install permanent baffles around attic accesses. Baffles and required accessories shall be furnished and installed in a manner such that there is a continuous pathway along the underside of the roof from the soffit ventilation to the roof ridge. The removal contractor must contact the A&E before insulation installation, so that an inspection of the baffling may be performed.

   Baffles are to be installed at building eaves regardless of whether there is an existing ventilation system or not.

B. Baffles Around Heat Producing Devices

1. Install noncombustible baffles around heat producing devices to provide the following clearances:

2. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless certified for installation surrounded by insulation: 3 inches from outside face of fixtures and devices or as required by National Fire Protection Association (NFPA) 70 and, if insulation is to be placed above fixture or device, 24 inches above fixture.

3. Masonry chimneys or masonry enclosing a flue: 2 inches from outside face of masonry. Masonry chimneys for medium and high heat operating appliances: Minimum clearances required by NFPA 211.

4. Vents and vent connectors used for venting the products of combustion, flues, and chimneys other than masonry chimneys: minimum clearances as required by NFPA 211.

5. Gas fired appliances: Clearances as required in NFPA 54.

6. Oil fired appliances: Clearances as required in NFPA 31.

7. Baffles around flues and chimneys is not required if the insulation and vapor retarder, when provided, passed ASTM E 136, in addition to meeting all other requirements stipulated in Part 2. The baffles are also not required when chimneys are certified by the manufacturer for use in contact with insulating materials.

C. Protection of Ventilation System

1. Before installation of insulation, inspect existing HVAC equipment and ductwork to ensure that insulation will not infiltrate the air distribution/ventilation system. Where potential infiltration sources have been identified, do not install insulation until repairs/modifications have been made to rectify the problem. Removal contractor will furnish and install all necessary accessories recommended by the insulation manufacturer so that the completed insulation work does not block ventilation pathways.

3.03 INSTALLATION

A. The removal contractor must inform the A&E when insulation installation is to begin.

B. Store, handle, and install insulation in strict accordance with manufacturer's instructions. Keep material dry and free of extraneous materials. Removal contractor will be responsible for providing personal protective clothing and respiratory equipment recommended by the insulation manufacturer and to be sure this equipment is used by his installers at all times insulation work is in progress. Observe safe work practices. Use only pneumatic equipment compatible with insulation material. Operate equipment in accordance with the manufacturer's instructions. Do not tamp or rod insulation. Install insulation using the amount (by weight) of material per square foot required by the insulation manufacturer to achieve the specified R-value.

C. Replace insulation in attic areas where VCI removal has been completed and, if necessary, in other areas to provide the specified minimum R-value according to State of Montana building codes. For pneumatic installations, use lowest air pressure allowed by manufacturer's instructions. Do not blow insulation into electrical devices, soffit vents, or mechanical vents that open into attic or other spaces to provide ventilation.

D. Under no circumstance shall baffles restrict a continuous ventilation pathway from the soffit vent to the roof ridge vent, gable end vents, or other attic ventilation ports. Provide baffles and other accessories from the manufacturer for this purpose. Baffles shall not be in direct contact with the roof.

E. Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.

F. Place insulation under electrical wiring occurring across ceiling joists. Pack insulation into narrowly spaced framing. Do not block flow of air through soffit vents.

G. Affix blanket insulation to all access panels and doors greater than 0.1 square meter (one square foot) in insulated floors and ceilings. Use insulation with same R-value as that for floor or ceiling.

H. Apply continuous vapor retarder in accordance with manufacturer's installation instructions. Do not install vapor retarders on both sides of insulation.

END OF SECTION

SECTION 13

DEMOLITION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, and incidentals required to demolish/dismantle and dispose of the buildings and structures, pavements, slabs, and other property improvements as indicated on the site-specific work plans.

B. The removal contractor will furnish all labor, material, equipment, and incidentals required to remove, contain, and properly transport and dispose of hazardous and regulated materials from the buildings and property before demolition as indicated on the site-specific work plans.

C. A&E personnel will conduct a predemolition investigation of each building and property improvement to be demolished. The findings of the predemolition investigation will be included in the site-specific work plans.

D. During the predemolition investigation, A&E personnel will coordinate with the property owner and the Volpe Center to identify building contents to be disposed, building contents to be removed and stored by the property owner, and building contents to be stored temporarily on behalf of the property owner. The disposition of listed items will be provided in the site-specific work plans. Items not removed from the building by the property owner at the time demolition is to begin will be removed and disposed of by the removal contractor as part of the demolition work.

E. The government may require bulk removal of VCI before building demolition. If required, VCI shall be removed from locations indicated on the site-specific work plans.

F. Blasting and the use of explosives will not be permitted for any demolition work.

G. The removal contractor must incorporate demolition-specific recommendations provided by EPA, Volpe, and A&E H&S as they relate to equipment selection, dust control, and material handling.

1.02 SUBMITTALS

A. Submit to the Volpe Center a demolition schedule and biweekly demolition schedule updates.

1.03 JOB CONDITIONS

A. Protection

1. Execute the demolition and removal work to prevent the deposition of ACM, dust, debris, stormwater runoff, or dust suppression water outside the limits of work.

2. The removal contractor shall protect all overhead utilities and known subsurface utilities identified on the site-specific work plans.

B. Conditions of Structures

1. EPA, Volpe Center, and A&E assume no responsibility for the actual condition of the structures to be demolished. The removal contractor shall be aware that many of the buildings and structures may be in an advanced state of deterioration. The condition of the buildings shall not relieve the removal contractor of the responsibility for performing the dismantling, demolition, and decontamination work safely and in accordance with the specifications.

C. Damage Repair

1. Promptly repair damage caused to adjacent structures, structures to be protected, facilities, or utilities by demolition operations at no additional cost to EPA and the government. Repairs shall be made to restore any damaged items to a condition equal to that which existed before demolition.

D. Traffic Access

1. Conduct demolition operations and the removal of demolition debris in a manner such that there is minimum interference with public roads.

2. Do not close or obstruct streets, walks, or other facilities without permission from the Volpe Center, A&E H&S, and the applicable Police Department. Furnish alternate routes around closed or obstructed traffic in access ways.

1.04 REGULATORY REQUIREMENTS

A. All work shall be performed in accordance with all applicable federal, state, and local regulations, laws, codes, and ordinances governing demolition and the handling, transportation, and disposal of solid waste and asbestos waste, hazardous chemicals and materials, and liquid wastes.

B. The removal contractor shall obtain all necessary nonenvironmental permits and approvals required to perform the demolition, transportation, and disposal.

1.05 DISPOSAL REQUIREMENTS

A. No material or equipment within the limits of demolition shall become the removal contractor's property. Salvage of steel and other metals for reprocessing is not allowed.

B. The unlined Asbestos Landfill at the Lincoln County Landfill Facility is classified by ARM 17.50.504 as a Class IV Landfill. Class IV Landfills in Montana are permitted to accept only Group III or Group IV Wastes. Group III Wastes as described in ARM 17.50.503 include wood wastes and non-water soluble solids. Group III wastes are characterized by their general inert nature and low potential for adverse environmental impacts. Examples of Group III Solid Wastes include, but are not limited to,

1. Inert solid waste such as unpainted brick, dirt, rock, and concrete

2. Clean, untreated, unglued wood materials, brush, unpainted or untreated lumber, and vehicle tires

3. Industrial mineral wastes that are essentially inert and non-water soluble and do not contain hazardous waste constituents

Group IV Wastes include construction and demolition wastes, and asphalt, except regulated hazardous wastes.

C. The removal contractor must obtain approval for all disposal locations before a material's disposal.

D. The removal contractor shall prepare manifests for transportation and disposal of hazardous and regulated materials removed from the building(s) or property. The government will be the waste generator for manifesting purposes and will sign all hazardous waste manifests and solid waste shipping and record logs. Provide the Volpe Center with the proper copies of the written manifests and logs verifying receipt of each load at the disposal facilities, the quantity received (volumes and weights as necessary), and verification of proper disposal.

E. The removal contractor shall assign a single, specific employee to prepare manifests, track disposal, inspect waste loads, and act as the Volpe Center contact for all transportation and disposal issues.

F. The removal contractor shall dispose of all demolition debris and VCI at the Class IV Asbestos Landfill located at the Lincoln County Landfill unless directed otherwise by the Volpe Center or A&E H&S.

PART 2 EXECUTION

2.01 GENERAL

A. Work Sequence

1. Meet with the Volpe Center to review the site-specific work plans and schedule for demolition sampling and related activities. The removal contractor must coordinate all demolition activities with sampling scenario requirements defined by EPA.

2. Establish work zones and temporary facilities at the demolition site.

3. Identify and disconnect overhead and underground utilities.

4. Remove items from the building that are to be stored on behalf of the property owner or disposed.

5. Remove hazardous and regulated materials from the building and dispose at facilities licensed to accept the various types of wastes.

6. Relocate sheds, support buildings, and other property improvements to be protected during demolition activities.

7. Perform bulk removal of VCI if required from locations identified in the site-specific work plans.

8. Demolish/dismantle the building(s), pavements, and other property improvements identified in the site-specific work plans.

9. Transport demolition debris and dispose of at the Class IV Asbestos Landfill.

2.02 DEMOLITION/DISMANTLING

A. Demolish all structures within the horizontal limits of work to the vertical limits identified in the site-specific work plans. Transport and dispose of all materials generated during decontamination and demolition as specified herein, and in accordance with all applicable laws and regulations.

B. Unless otherwise approved by the Volpe Center, proceed with demolition from the top of each structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members of lower levels. Unless approved by the Volpe Center, complete demolition of each structure before beginning demolition on subsequent structure.

C. Remove structural framing members by methods suitable to avoid dust generation. Use water mist, temporary enclosures, and other suitable methods to limit the production of dust during demolition operations. The removal contractor shall provide all water for dust control, personnel, equipment decontamination, and other uses during the performance of the work.

2.03 LIMITS OF DEMOLITION

A. The horizontal limits of demolition shall consist of all aboveground structures within the limits of demolition shown on the drawings. The structures to be demolished include houses, storage buildings, offices, machinery, equipment, tanks, and other miscellaneous items.

B. Demolish and dispose of all discarded or stored scrap metal items, raw materials in containers, lumber, building materials, and other miscellaneous items within the limits of demolition. Removal and disposal of preexisting uncontainerized piles of soil, vermiculite, or trash outside the building footprints are included in the work.

C. Except as specifically noted on the site-specific work plans, the vertical limits of demolition shall consist of each structure and all attached and enclosed machinery, equipment, appurtenances, waste, and debris down to the following limits:

1. Foundations and footings to bottom of footing

2. Slab-on-grade structures to the bottom of slab

3. Wood, block, or brick floor areas: remove floor and subgrade to 1 foot below first floor bottom elevation

2.04 SITE PREPARATION

A. Before commencement of demolition activities at each building or structure, the following preparation activities shall be performed at a minimum.

1. Install runoff containment and collection facilities as specified in Section 5 of these Construction Specifications.

2. Install dust control equipment and temporary facilities in accordance with the removal contractor's approved demolition plan.

3. Isolate and disconnect all water supply connections, electric service, natural gas service, sewer service, cable TV service, etc.

4. Isolate and plug all the onsite septic piping originating within the building. Line shall be permanently plugged at its point of discharge from the building, or at the nearest accessible point downstream.

B. Before the commencement of demolition near abutting properties, erect temporary protection systems, including temporary shoring, if necessary.

C. Before the commencement of demolition operations, erect new security fencing and initiate site security operations as specified in Section 2 of these Construction Specifications.

2.05 DECONTAMINATION

A. The site-specific work plan for a property to be demolished will include descriptions and locations for bulk removal of VCI if required. The site-specific work plan will also include a list, accurate as of the date of inspection, of items requiring decontamination or special handling and disposal before building demolition. Examples include white goods such as refrigerators and air conditioners, which will require removal of refrigerants before decontamination and disposal at the Lincoln County Landfill or removal of refrigerants and disposal at the Class IV Asbestos Landfill as ACM.

B. Items requiring decontamination shall be HEPA vacuumed or wet wiped as appropriate. It is not intended that the removal contractor necessarily remove encrusted or well-adhered material during the decontamination operations. Decontamination required for a building to be demolished shall be considered complete when all such loose material has been removed from all accessible surfaces, as determined by visual inspection.

C. Before demolition of the buildings, the removal contractor shall also remove and dispose of all waste piles consisting of dust, vermiculite, or other granular or particulate matter; scrap metal; rubble; debris; or building materials as part of the decontamination work.

2.06 PETROLEUM STORAGE EQUIPMENT

A. Remove and dispose of all fuel oils, hydraulic oils, oil sludges, and other petroleum products from equipment, pipelines, and tanks before demolition. A material handling and disposal plan must be provided to A&E H&S before the start of site work.

B. Demolish all petroleum storage tanks and appurtenances in accordance with State of Montana and City of Libby environmental and fire prevention regulations. Obtain permits for demolition of petroleum equipment where appropriate.

2.07 DUST CONTROL

A. The removal contractor shall implement dust control measures before, during, and after demolition activities. Dust control measures shall be performed during VCI removal, decontamination, demolition, handling, processing, loading, and all other site work activities. No visible dust emissions shall be permitted during demolition activities and related work.

B. The removal contractor shall not increase dust suppression water flow beyond that necessary to control dust, such that excessive water is generated during the conduct of the work. The removal contractor shall implement Stormwater, Sedimentation, and Erosion Control as specified in Section 5.

2.08 PROCESSING, LOADING, AND DISPOSAL

A. All materials and waste generated as a result of VCI removal and demolition operations shall be disposed of at the Class IV Asbestos Landfill unless directed otherwise by the Volpe Center or A&E H&S.

B. The removal contractor shall conduct demolition and loading operations such that the rate of loading and removal generally equals the rate of generation of demolition waste. The removal contractor shall proceed with loading and disposal of demolition and decontamination waste in the general order of its generation, such that the storage of waste does not exceed any established regulatory limit. Stockpiling of demolition debris shall not be permitted, unless approved by the Volpe Center.

C. Furnish, install, and maintain any temporary loading facilities, staging facilities, and parking areas required for the completion of waste removal activities.

D. All vehicles shall be decontaminated before leaving the removal contractor's established exclusion zones. Decontamination shall be sufficient to remove all dust, soil, or waste materials. At the site boundaries, all vehicles leaving the site shall be inspected by the removal contractor to ensure that no excess dust is present and no soil or material adheres to wheels or undercarriage. All excess dust, soil, and any waste material that is visible shall be removed from the waste hauling vehicles before leaving the site.

E. The removal contractor shall have full responsibility for and control over the movement of waste from the site to the disposal facilities and for regulatory compliance during transit, whether it be performed directly by the removal contractor's equipment and personnel or by subcontract to a third party transporter.

F. The removal contractor shall prepare manifests for transportation and disposal of each load. The government will be the waste generator for manifesting purposes and will sign all hazardous waste manifests and solid waste shipping and record logs. Provide the Volpe Center with the proper copies of the written manifests and logs verifying receipt of each load at the disposal facilities, the quantity received (volumes and weights as necessary), and verification of proper disposal. The removal contractor shall assign a single, specific employee to prepare manifests, track disposal, inspect waste loads, and act as the Volpe Center contact for all transportation and disposal issues.

G. The removal contractor shall be responsible for any and all actions necessary to remedy situations involving waste spilled in transit.

H. Routes and timing must be coordinated with appropriate state and local regulatory agencies. While involved in the performance of the work under contract, and while not in transit, all waste transportation vehicles must be stored within the site boundaries or established exclusion zone. Under no circumstances shall the removal contractor use public roadways or public parking areas for vehicle parking or staging.

END OF SECTION

SECTION 14

RESIDENTIAL EARTHWORK

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, supervision, materials, equipment, tools, permits, and incidentals necessary to perform excavation, filling, backfilling, and grading of the areas shown on the site-specific work plans and specified herein, plus any additional excavation required for establishment of operations. The work as described under this Section shall include all excavation, backfilling, compacting, grading, and related work at properties requiring removal of contaminated soil.

B. During construction, all excavation, filling, backfilling, and grading shall be performed in a manner and sequence that will avoid damage to existing properties, houses, fences, decks, barbecue grilles, privacy screens, lawn ornaments, sprinkler systems, streets, or other features adjacent to the work areas.

C. Dust control shall be maintained by the removal contractor at all times.

D. Topsoil and common fill will be provided by the government and stockpiled at several locations in the Libby area.

E. The removal contractor shall provide structural fill.

F. Landscaping will be completed under a separate government contract.

1.02 REFERENCE STANDARDS

A. ASTM

1. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils

2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil using Modified Efforts (56,000 foot pound force/ft^3) (2,700 kN-m/m^3)

3. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

4. ASTM D2974 - Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

5. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

6. ASTM D3740 - Standard Practice for Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction

7. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. OSHA 29 CFR Part 1926, Construction Industry

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 QUALITY ASSURANCE

A. The removal contractor shall be responsible for the quality of work and materials during earthwork operations and any settlement of backfill materials. The A&E will verify the adequacy of site preparation and acceptability of available fill material, and will observe the placement and compaction of all fill material. All work found unsatisfactory shall be corrected in an approved manner at no additional cost to the government.

PART 2 PRODUCTS

2.01 GENERAL

A. The removal contractor will provide all materials and equipment in suitable and adequate quantity and quality as required to accomplish the work identified in the site-specific work plans and specified herein.

B. Topsoil and common fill will be made available to the contractor by the government. The removal contractor shall be responsible to provide all structural fill in accordance with the specifications. The removal contractor shall be solely responsible for modifications to the moisture content of all materials required to achieve the specified compaction. The Volpe Center is not responsible to maintain any specific level of moisture in the soil at its stockpiled location.

C. Provide all water necessary to control dust on the property and adjacent roadways, all water necessary for thorough compaction of backfill materials, and all other water needs to complete the work of this section.

2.02 COMPACTION EQUIPMENT

A. Compaction equipment shall be of suitable type and adequate to obtain the densities specified and shall provide satisfactory breakdown of materials to form a dense fill. Acceptable compaction equipment shall consist of pneumatic tire, tamping foot, sheepsfoot rollers, or vibratory plate compactors unless the removal contractor can demonstrate, to the satisfaction of the Volpe Center, that other equipment will produce satisfactory results.

B. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort. If specified densities are not obtained, larger and/or different types of additional equipment shall be provided by the removal contractor. Hand-operated equipment shall be capable of achieving the specified densities.

C. The removal contractor must notify A&E oversight of planned backfilling activities, to coordinate A&E evaluations of grading and compaction performed by the removal contractor.

2.03 MOISTURE CONTROL EQUIPMENT

A. Equipment for applying water shall be of a type and quality adequate for the work, shall not leak, and shall be equipped with a pressurized distribution system to assure uniform application. Equipment for disking and drying out material shall consist of blades, discs, or other approved equipment.

2.04 STRUCTURAL FILL

A. Structural fill for use as subbase in gravel driveways and gravel roads shall consist of an angular, hard, durable, processed, crushed gravel conforming to the requirements of the State of Montana Department of Transportation Standard 701.02.5 Crushed Base Course Type "B," Grade 2.

B. Structural fill shall have no particles larger than 1½ inches in largest dimension and conform to the following gradation:

Sieve Size	**Percent Finer by Weight**
1½ inches	100
No. 4	25 to 55
No. 200	0 to 8

END OF SECTION

SECTION 15

VERMICULITE-CONTAINING INSULATION REMOVAL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This specification applies to the removal, transport, and disposal of VCI from specific locations in buildings to be reoccupied after VCI removal as identified in this task order. The work addressed in this section shall be performed in accordance with all applicable federal, state, and local regulations pertaining to asbestos containing materials.

B. VCI removal from locations within the building(s), as identified in the site-specific work plans; site preparation, site security; equipment and personnel decontamination facilities; cleaning, temporarily storing, and returning the property owner's furnishings and other items in identified removal areas; protection of the building, such as walls, floors, ceilings; dust suppression; clean up; and restoration of properties to be reoccupied.

C. This specification also applies to the bulk removal, transport, and disposal of VCI from structures identified for demolition. Work performed under this specification shall be performed in accordance with all applicable federal, state, and local regulations before beginning demolition of the structure.

D. All other potential ACMs including floor tile, transite board, roofing materials, etc. are considered to be Class II asbestos under the OSHA Standard 29 CFR 1926.1101 and shall be disposed as part of the demolition debris. During the demolition removal of these ACMs, the work area shall be isolated and engineering controls implemented by the removal contractor in accordance with this OSHA Standard.

E. The removal contractor will furnish all labor, materials, equipment, and incidentals required to remove and dispose of all VCI from specifically identified locations such as attics; crawl spaces; wall cavities in residential, commercial, industrial, and public buildings. The work also includes removal and disposal of ceiling, wall, and floor materials removed from the buildings to access the VCI. The materials removed from the properties and demolition debris shall be handled as asbestos-contaminated material.

F. The removal contractor shall be responsible for containing all removed VCI and other asbestos contaminated material resulting from VCI removal and related work in appropriate vehicles such as vacuum trucks or roll-off containers, fitted with air-tight, leakproof covers.

G. The removal contractor shall be responsible for managing the removal activities in a manner such that free liquids or free draining liquids are not present in the waste.

H. Transport and disposal of VCI and other ACM shall be in accordance with the Transport and Disposal Section of these Construction Specifications.

PART 2 PRODUCTS

2.01 RESPIRATORY PROTECTION

A. The removal contractor shall provide respirators to all workers working in the regulated area. All respiratory protection programs shall be established in accordance with the Libby CSHASP and the respiratory protection requirements of 29 CFR 1910.134, 29 CFR 1926.58(h), and 29 CFR 1926.103. Adherence to these regulations shall be considered a requirement of these specifications.

2.02 ELECTRICAL EQUIPMENT

A. Provision of temporary power inside the work area may create additional hazards. OSHA considers removal action projects under 29 CFR 1926, Subpart K (in particular, Sections 404, 405, 416, and 477). There are special requirements for supplying temporary power. This shall be done by supplying power through Ground Fault Circuit Interrupters (GFCI). Use of GFCIs to protect all circuits provides the safest power source since any significant current leakage will trip the circuit. These devices prove most effective when kept outside the work area away from the high humidity. An assured equipment grounding program requires regular inspection of all tools, cords, and electrical devices with written documentation maintained.

B. Lights, vacuum cleaners, negative air systems, drills, saws, heaters, etc. shall be inspected by the removal action contractor regularly for damage, proper grounding, and integrity of insulation. All identified deficiencies will be taken off line immediately and repaired or replaced before being used again on the project.

C. Extension cords used with portable electric tools and appliances must be the 3-wire type and connected to a GFCI circuit. Extension cords shall be protected from accidental damage and shall not be fastened with staples, hung from nails, or suspended by wire.

D. Portable electric hand tools shall be equipped with a 3-wire cord having a ground wire permanently fixed to the tool frame, or be of the double insulated type and labeled as such.

2.03 SCAFFOLDING

A. This project may require the use of scaffolding on a case-by-case basis. Proper setup, regular inspections, and basic maintenance shall not be overlooked. All scaffolding used during this project shall conform to the requirements of 29 CFR 1910.28, 29 CFR 1910.29, and 29 CFR 1926.451.

B. All scaffolding will be securely fastened to the structure it is intended to service.

C. In many removal projects, manually propelled mobile scaffolding provides a convenient and efficient work platform. Federal regulations (29 CFR 1926.451) require that when free standing mobile scaffolding is used, the height shall not exceed four times the minimum base dimension. This requirement is based on the fact that scaffolding is easily turned over. Since relatively little force is required to tip a scaffold, it becomes critically important to make sure that wheels on mobile scaffolds move freely and are in good repair.

D. If rented scaffolding is used, all components shall be inspected before accepting it. Wheels shall turn freely and be lubricated. All components such as cross bracing, railings, pin connectors, planking, or scaffold grade lumber shall be available before the units are assembled.

E. When workers ride on mobile scaffolding, the removal action contractor shall ensure the following conditions exist.

1. The floor or surface is within 3 inches of level and free from pits, holes, or obstructions.

2. The minimum dimension of the scaffold base, when ready for rolling, is at least one-half of the height. Outriggers, if used, shall be installed on both sides of staging.

3. The wheels are equipped with rubber or similar resilient tires.

4. All tools and materials are secured or removed from the platform before the mobile scaffold is moved.

E. Guardrails and toeboards shall be installed on all open sides and ends on scaffolds more than 10 feet above the ground or floor. Scaffolds 4 feet to 10 feet in height, having a minimum horizontal dimension in either direction of less than 45 inches, shall have standard guardrails installed on all open sides and ends of the platform.

F. Planking used on scaffolds shall extend over their end supports not less than 6 inches or more than 12 inches, and be secured from movement.

G. The removal contractor shall be solely responsible for the erection and use of all scaffolding used during the project.

2.04 POLYETHYLENE SHEETING

A. Polyethylene sheeting used to build containment areas or decontamination chambers shall be a minimum thickness of 6 mils. All polyethylene sheeting shall be used in widths selected to minimize the frequency of joints. Opaque polyethylene sheeting shall be used for worker decontamination units, mini-enclosures, or other structures requiring privacy.

B. Methods of attaching polyethylene sheeting will be agreed upon in advance by the removal contractor and the Volpe Center. Methods of attachment may include any combination of duct tape or other waterproof tape, furring strips, spray adhesive, staples, nails, screws, or other effective procedures capable of sealing adjacent sheets of polyethylene sheeting to dissimilar finished or unfinished surfaces under both wet and dry conditions.

2.05 ASBESTOS WASTE DISPOSAL BAGS

A. Asbestos waste disposal bags shall be constructed of 6-mil transparent polyethylene. Transparent bags are specified so that post-bagging visual inspection can determine if the bagged waste is properly wetted and that the waste has been double-bagged properly. Disposal bags shall be preprinted with labels as required by EPA, OSHA, and DOT regulations.

2.06 ASBESTOS WASTE DISPOSAL DRUMS

A. Asbestos waste disposal drums shall be of metal or fiberboard with locking ring tops and labeled in accordance with the requirements of the OSHA Hazard Communications Standard 29 CFR 1926.59(f). Warning signs that meet the requirements of 29 CFR 1926.58 (k)(1) shall also be posted on the drums.

2.07 SURFACTANT OR WETTING AGENT

A. Asbestos Surfactant or wetting agent shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water, or as specified by the manufacturer.

2.08 AIRLESS SPRAYERS

A. Airless sprayers with pumps capable of providing 500 pounds per square inch (psi) at the nozzle tip at a flow rate of 2 gallons per minute for spraying amended water shall be provided and used. ANSI-approved vacuum cleaners equipped with HEPA filters shall be provided and used.

2.09 HEPA FILTRATION SYSTEMS

A. HEPA filtration systems brought to the project site shall be uncontaminated and equipped with new filters. All filtration equipment shall be in compliance with ANSI Standard Z9.2-79, local exhaust ventilation. The removal contractor's competent person shall inspect both the interior and exterior of each filtration unit to determine the unit's integrity.

2.10 WARNING SIGNS

A. To protect the public, the removal contractor shall comply with 29 CFR 1926.58(k)(1) by posting safety warning signs at the perimeter of the regulated area (minimum size of 12 inches x 18 inches with black letters on a red and white background) that follow the sample format shown here.

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING ARE REQUIRED IN THIS AREA

2.11 OTHER EQUIPMENT

A. The removal contractor shall provide all other equipment required to complete this removal action. This equipment may include, but is not limited to, heavy equipment, hand tools, wood, fasteners.

2.12 ENCAPSULANTS, SEALANTS, AND CAULKING

A. Lock-down encapsulant used for sealing cleaned, caulked, and foamed surfaces shall be formulated from acrylic polymers to provide a durable barrier over building surfaces to prevent residual asbestos fibers from becoming airborne. Lock-down encapsulant shall be CONTROL Lock-Down Encapsulant as manufactured by Grayling Industries, Inc. of Alpharetta, Georgia, or approved equal.

B. Multipurpose encapsulant used for cleaned surfaces and air misting shall be formulated from (vinylidene fluoride) polymers blended with flame retardants to provide a durable barrier over building surfaces to prevent residual asbestos fibers from becoming airborne. Multipurpose encapsulant shall be CONTROL Multi-Use Encapsulant as manufactured by Grayling Industries, Inc. of Alpharetta, Georgia, or approved equal.

C. Insulating foam sealant for sealing gaps, cracks, and around windows and doors, electrical outlets, switches, and fixtures shall be polyurethane foam based, Class 1 foam, UL listed as fire retardant. Insulating foam sealant shall be Great Stuff as manufactured by Dow Chemical Company or approved equal.

D. Caulking shall be one part, gun grade, silicone base sealant formulated specifically for interior or exterior use as required. Silicone caulking shall be as manufactured by General Electric, Dow Corning, or approved equal.

2.13 SUBSTITUTIONS

A. The Volpe Center will consider requests for substitutions of materials, equipment, and methods only when such requests are accompanied by full and complete technical data and all other information required by the Volpe Center to evaluate the proposed substitution. The removal contractor shall not substitute materials, equipment, or methods unless such substitution has been approved for this work by the Volpe Center.

PART 3 EXECUTION

3.01 VCI CONTAINMENT

A. In general, VCI removed from attics, walls, and other locations shall be stored in air-tight roll-off containers or vacuum trucks.

B. VCI not stored in air-tight roll-off containers or vacuum trucks shall be stored in drums or double bags.

C. The removal contractor shall be responsible for bagging, containing, and handling VCI and other ACM removed by vacuum from wall cavities, attics, and other locations during interior removals in a manner that prevents the release of asbestos fibers.

D Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up or disposal activities shall be immediately cleaned up using HEPA-filtered vacuum equipment and/or wet methods as appropriate.

E. The removal contractor shall be responsible for implementing pollution control measures throughout the removal activities. Trucks, vehicles, and equipment shall be fueled and lubricated offsite or in a controlled manner. The removal contractor shall be responsible for conducting its operations such that there are no uncontrolled spills of fuel, oil, lubricants, chemicals, etc. to the ground or surface waters. Should a spill occur, the removal contractor shall, at its expense, perform all cleanup operations as required by federal, state, or local regulations.

3.02 REGULATORY REQUIREMENTS

A. The removal contractor will complete all work in this specification according to the Safety and Health Standards for the Construction Industry Title 29, Part 1926 of the Code of Federal Regulations (29 CFR 1926), Occupational Safety and Health Standards for General Industry Title 29 Part 1910 of the Code of Federal Regulations (29 CFR 1910), applicable sections of Protection of the Environment (40 CFR), Transportation (49 CFR), CSHASP, and the SSHASP.

B. Conform to all project, state, local, and/or federal hazardous materials regulations pertaining to the handling, transportation, and disposal of suspected asbestos-contaminated materials.

END OF SECTION

SECTION 16

TRANSPORT AND DISPOSAL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. VCI removed from residential, commercial, public, and industrial buildings in the Libby, Montana area shall be disposed at the Class IV Asbestos Landfill located at the Lincoln County Landfill.

B. Vermiculite-contaminated soils removed from yards, gardens, planters, and other specific use areas on selected residential, commercial, public, and industrial properties in the Libby, Montana area shall be disposed at the mine site repository.

C. On a case-by-case basis, the government may allow disposal of VCI and related asbestos-containing debris at the mine site repository.

D. On a case-by-case basis, the government may allow disposal of limited quantities of asbestos contaminated soil, demolition debris, and other materials generated during contaminated soil excavation at the Class IV Asbestos Landfill.

E. The removal contractor shall be responsible for the transport and disposal of the VCI, vermiculite-contaminated soils, and other ACM generated during project activities.

F. The removal contractor will use only truck haulers licensed in the State of Montana.

G. The removal contractor shall maintain all operating records/manifests required by the Federal Resource Conservation and Recovery Act (Public Law 94-580), DOT, the State of Montana, and all other states to be traversed, as applicable. In general, the removal contractor shall comply with all applicable regulatory requirements, including federal, state, or local laws, codes, and ordinances that govern or regulate asbestos-contaminated wastes.

1.02 CONTAMINATED SOIL TRANSPORT

A. The removal contractor shall load, transport, and dispose of all asbestos-contaminated soils in a manner such that there is no release of asbestos fibers. Material generated from exterior removals shall be disposed of in accordance with applicable local, state, and federal regulations.

B. Vacuum trucks and cabs of trucks used to haul contaminated soil shall be equipped with positive pressure units equipped with HEPA filters capable of preventing asbestos fiber migration into the truck cab during transport and disposal activities in regulated areas.

C. Beds of dump trucks used to haul contaminated soil shall be watertight and covered with tight-fitting tarps secured in a manner that prevents release of asbestos fibers during transport.

D. Drivers of dump trucks not equipped with positive pressure units and HEPA filters shall wear PPE as determined by A&E H&S.

E. Disposal at the Class IV Asbestos Landfill, if allowed, shall be in strict accordance with the current revision of the Lincoln County Class IV Asbestos Landfill Operations Plan and all Addenda.

F. The removal contractor shall coordinate all disposal activity at the Class IV Asbestos Landfill with the government's landfill operator and the Volpe Center.

G. Following disposal, all trucks shall be thoroughly decontaminated before leaving the disposal location. Alternative measures, such as draping the truck body with polyethylene sheeting, may be approved by A&E H&S on a case-by-case basis, depending upon site conditions.

1.03 VCI TRANSPORT

A. VCI removed from residential, commercial, public, and industrial buildings shall be stored in air-tight steel roll-off containers or dedicated vacuum trucks.

B. VCI or other asbestos-contaminated material such not stored in roll-off containers shall be double wrapped in polyethylene sheeting, double bagged, or drummed.

C. Vacuum trucks and cabs of trucks used to haul roll-off containers shall be equipped with positive pressure units equipped with HEPA filters capable of preventing asbestos fiber migration into the truck cab during transport and disposal activities in regulated areas.

D. Beds of dump trucks or pick-up trucks used to haul wrapped, bagged, or drummed VCI shall be covered with tight-fitting tarps secured in a manner that prevents release of asbestos fibers during transport.

E. Drivers of trucks not equipped with positive pressure units and HEPA filters shall wear PPE as determined by A&E H&S.

PART 2 EXECUTION

2.01 GENERAL

A. All transport and disposal of VCI, other ACM, and demolition debris shall be performed in a manner such that there is no release of asbestos fibers.

2.02 LANDFILL DISPOSAL

A. The removal contractor shall load, transport, and dispose of all VCI, removed wallboard, plaster, paneling, etc. and spent PPE and other asbestos-contaminated materials in a manner such that there is no release of asbestos fibers. Material generated from interior removals shall be disposed of in accordance with applicable local, state, and federal regulations.

B. Disposal at the Class IV Asbestos Landfill shall be in strict accordance with the most current revision of the Lincoln County Class IV Asbestos Landfill Operations Plan and all Addenda.

C. The removal contractor shall coordinate all disposal activity at the Class IV Asbestos Landfill with the government's landfill operator and the Volpe Center.

D. VCI and other ACM contained in airtight roll-off containers shall be temporarily placed in a location designated by the government's landfill operator.

E. Roll-off containers and vacuum trucks shall be emptied in the misting tent, or other location approved by the Volpe Center, at the Class IV Asbestos Landfill.

F. VCI and other ACM not transported to the Class IV Asbestos Landfill in air-tight roll-off containers shall be double wrapped in 6-mil polyethylene sheeting and placed directly in the operating landfill cell in a location designated by the government's landfill operator. Lift thickness for VCI and other ACM shall not exceed 18 inches.

G. ACMs contained within bags or drums shall be inspected as they are off-loaded at the active cell. ACMs in damaged containers shall be repacked in empty drums or bags as necessary.

H. ACM containers shall be placed on the ground at the disposal site, not pushed or thrown out of trucks, since the weight of the wet material could rupture the containers.

2.03 MINE SITE REPOSITORY DISPOSAL

A. The government has constructed a transfer station referred to as the Amphitheatre Area off of Highway 37, approximately 1½ miles up Rainy Creek Road leading to the abandoned vermiculite mine. Asbestos-contaminated soil and related materials removed from residential, commercial, public, and industrial properties shall be transported by the removal contractor to the Amphitheatre Area for temporary storage. The Amphitheatre Area is equipped with personnel and equipment decontamination facilities and is operated by a separate government contractor on an as-needed basis. Stockpiled contaminated soil and related ACM is periodically moved to the abandoned mine by a separate government contractor for permanent disposal.

B. The removal contractor shall coordinate disposal of contaminated soil and related ACM at the Amphitheatre Area with the Volpe Center. All disposal activity shall comply with established Amphitheatre operation protocols as required by the Volpe Center.

C. All trucks disposing contaminated soil at the Amphitheatre Area shall be thoroughly decontaminated before leaving the area.

D. All mine site operations must be conducted in accordance with the Mine Site Operations Plan.

END OF SECTION

SECTION 17

SHOTCRETE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The removal contractor will furnish all labor, materials, equipment, and incidentals required to install shotcrete as indicated on the site-specific work plans.

1.02 SUBMITTALS

A. For structural applications only: Submit experience record in shotcrete work of each nozzleman and foreman to be employed on the project as specified.

1.03 REFERENCE STANDARDS

A. ASTM

1. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
2. ASTM C150 – Standard Specification for Portland Cement
3. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

B. ACI

1. ACI 506R – Guide to Shotcrete
2. ACI 506.2 – Specification for Materials, Proportioning, and Application of Shotcrete
3. ACI 506.3R – Guide to Certification of Shotcrete Nozzlemen

C. AWWA

1. All Shotcrete shall conform to the requirements of AWWA D110.

D. National Ready Mixed Concrete Association (NRMCA) and Truck Mixer Manufacturer's Bureau (TMMB).

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. Contractor's Qualifications: Shotcrete construction shall be performed by an established contractor having previous experience with shotcrete.

B. For structural applications of concrete only: Foreman's and Nozzleman's Qualifications: Foreman supervising the placing of shotcrete shall have a minimum of 3 years experience as a nozzleman. Each shotcrete nozzleman shall have a minimum of 2 years experience on similar applications and shall be able to demonstrate by the tests specified in Paragraph 2.03C the ability to satisfactorily gun shotcrete of the required quality.

C. Independent Testing Laboratory

D. Shotcrete Quality: Slump shall be 4 inches for flat work and 2 inches for vertical work. Water shall be kept to a minimum to obtain shotcrete that is as dense and watertight as possible. The cement factor shall be between 7 and 8 (94 pound) sacks per cubic yard. Select proportions of ingredients to meet the design strength and materials limits to produce shotcrete having placability, durability, strength, appearance, and other required properties.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. Like items of materials shall be the end products of one manufacturer to provide standardization for appearance, maintenance, and manufacturer's service.

2.02 MATERIALS

A. Materials shall comply with this Section and any applicable state or local requirements.

B. Cement: Domestic portland cement conforming to ASTM C150, Type II. Air entraining cements shall not be used. Cements produced by a manufacturer that uses hazardous waste derived fuel as an energy source for its kilns shall not be used. Cement brand must be approved by the Engineer, and one brand shall be used throughout the work.

C. Aggregates: Maximum coarse aggregate size of 3/8 inch. Test aggregates for potential alkali reactivity.

D. Water: Potable water free of oil, acid, alkali, salts, chlorides, organic matter, or other deleterious substances.

2.03 MIXES

(A through E apply to structural applications only.)

A. Develop shotcrete mixes and their testing by an independent testing laboratory engaged by and at the expense of the removal contractor.

B. Proportion shotcrete mixes by preconstruction testing in accordance with ACI 506.2.

C. Compression Tests: Provide testing of the proposed shotcrete mixes to demonstrate compliance with the specified compression strength requirements in conformity with ACI 506.2.

D. Entrained air, as measured by ASTM C231.

1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.

E. Slump of the shotcrete as measured by ASTM C143.

F. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

PART 3 EXECUTION

3.01 PREPARATION

A. The removal contractor must inspect all areas where shotcrete will be placed to identify and protect existing utilities, pertinent features, and any other items that could be damaged by its application. The A&E will inspect removal contractor preparations to ensure that all necessary precautions are taken with regard to utilities and features before shotcrete application.

B. Remove all loose material, dirt, and mud from rock surfaces. Wet rock surfaces before shotcreting and remove all standing water.

C. For structural applications only: Determine, provide, and install accessories such as expansion bolts and adhesive anchors in conjunction with fittings and hardware to support the reinforcement from the rock surfaces providing the spacings and clearances indicated and prevent its displacement during the erection of the reinforcement and placement of shotcrete.

3.02 MIXING AND PLACEMENT OF SHOTCRETE

A. For nonstructural placement, the removal contractor must add fiber mesh to the shotcrete mix, in a proportion to be decided by the A&E.

B. Method of shotcreting shall be the wet-mix process.

C. For structural applications only: Vertical shooting wires shall be installed and tensioned to establish uniform and correct thickness of shotcrete. Shooting wires shall be spaced at 2 feet on center around the circumference. The final coat shall be applied true to shooting wires so as to form a cylindrical surface. Remove wires and fill low spots left by wires before final finishing.

D. The nozzle shall be held at such a distance and position that the stream of flowing material shall be, as nearly as practicable, perpendicular to the surface being covered.

   For structural applications only: Remove rebound and overspray from rock substrate, shotcrete in place, and reinforcing before placing shotcrete. Should a deposit of rebound, overspray, or sand be covered with shotcrete, it shall be cut out and replaced with proper material.

E. Velocity of material leaving the nozzle shall be uniform and such to produce a minimum of rebound. The surface to which shotcrete is applied shall be free from frost. No shotcrete shall be placed on days when the wind is more than 20 miles per hour or when moist inclement conditions prevail on the work surfaces.

F. The shotcrete mixture shall be such that once in place, the surface will have a rich glossy appearance. For structural applications only: In the event of sagging, the shotcrete shall be completely removed and the defective area replaced.

G. At the end of the day's work, or similar stoppage period, the shotcrete shall be sloped off at an angle of approximately 45 degrees. Before placing adjacent sections, the sloped portions shall be thoroughly cleaned and wetted by means of air and water blast.

H. All overspray will be removed by the removal contractor. All utilities will be protected during shotcrete activities.

I. Finishing Shotcrete

1. All shotcrete construction shall receive a wood float finish.

J. Curing Shotcrete (for structural applications only)

1. Curing shall be accomplished by keeping the shotcrete wet continuously for 7 days. If the lining is built up in coats, each time a new coat is applied, a new 7-day curing period begins, superceding the curing schedule on prior coats. Natural curing may be allowed if the relative humidity is at or above 85 percent.

2. If shotcreting is not started until the temperature is 40 degrees F and rising, and is terminated when the temperature is 40 degrees F and falling, no special provisions need be made for protecting the shotcrete against low temperatures. Shotcrete placed below these temperatures shall be protected in accordance with ACI 506R. Shotcrete shall not be placed on frozen surfaces. For structural applications only: Shotcrete with a strength lower than specified because of cold weather shall be removed and replaced with sound material.

K. Patching and Repairing Shotcrete

1. Dry patches, slugs, sags, sloughs, voids, sand pockets, honeycombing, or other defects shall be removed and repaired to the satisfaction of the A&E.

3.03 FIELD TESTING (FOR STRUCTURAL APPLICATIONS ONLY)

A. A minimum of one test panel for each 20 cubic yards of shotcrete, but at least one panel per shift, shall be made during the progress of the work. Additional panels shall be made if deemed necessary by the Engineer. The test panels shall be made from the shotcrete as it is being placed and shall, as nearly as possible, represent the material being applied. The method of making the test samples shall be as follows:

1. A rectangular frame of 4-mesh wire fabric 2 feet 6 inches square and 6 inches deep shall be secured to a plywood panel and hung or placed in the location where shotcrete is being placed. This form shall be filled in layers simultaneously with the nearby application. After 24 hours, the fabric and plywood backup shall be removed and the sample slab shall be sent to the testing laboratory. At the age of 7 days, nine 3-inch cubes or cores shall be cut from each sample slab and subjected to compression tests in accordance with current ASTM standards. Three cubes or cores shall be tested at the age of 7 days, three cubes or cores shall be tested at the age of 28 days, and three cubes or cores shall remain held in reserve.

2. All shipping and testing will be paid for by the removal contractor.

B. Test for slump and air content.

END OF SECTION

Appendix B

A&E Air Monitoring Frequencies and Record of Modification Form

Record of Modification
to the
Removal Action Work Plan (RAWP)
Field Activities
Modification Number: _____

Date: _____

Description of Modification (attach additional sheets if necessary;):_____

Potential Implications of Modification: _____

Duration of Modification (circle one):

Temporary Date(s):_____
Resident address(es): _____
_____

Permanent (Proposed Text Modification Section) Effective Date:_____

Proposed Text Modifications in Associated Guidance Document (attach additional sheets if necessary; state section and page numbers of RAWP that are affected by proposed modification):_____

Volpe Center Technical Review and Approval: _____ Date:_____

A&E Technical Review and Approval: _____ Date:_____

EPA Review and Approval: _____ Date:_____
(USEPA RPM or designate)

A&E Air Monitoring Frequencies

The following table shows 2008 frequencies for project task-based air monitoring performed by the A&E.

2008 Air Monitoring Frequencies			
Analytical Method		***PCM***	***AHERA***
Mine Road			
Clean Room		-	1/Week
Personal	Water Truck Driver	2/Month	-
	Operator	2/Month	-
	Laborer	2/Month	-
Remedial Investigations/Predesign Teams/Oversight			
Ambient (CDM Office)		-	1/6 Months
Ambient (EPA Info Center)		-	1/6 Months
Ambient (Sample Analysis Lab)			1/Month
Ambient (Fire Hall)			1/6 Months
Predesign (Attic Entries)		1/6 Months	-
Predesign (Soil Sampling)		1/6 Months	-
Oversight (Attic Inspections)		1/6 Months	-
Oversight (Soil Sampling)		1/6 Months	-
Landfill Asbestos Cell			
Personal	Laborer	Daily	
	Operator	Daily	
Clean Room			1/Event
Perimeter of Exclusion Zones			1/Month
Bulk Removal Sites			
Personal	Bulk Removal	1/Week	-
	Demo	Daily	-
	Detailing Attic	1/6 Months	-
	Wet Wipe/HEPA Vac Living Space	1/6 Months	-
Clean Room		-	1/Site
Excavation Sites			
Personal	Laborer	2/Month	-
	Excavator Operator	2/Month	-
	Haul truck Drivers	1/6 Months	-
Clean Room		-	1/Site
Perimeter of Exclusion Zones		-	1/Site/Day

PCM = Phase contrast microscopy, Method NIOSH 7400
AHERA = Asbestos Hazard Emergency Response Act, TEM performed by Method EPA 40 CFR Part 763 Final Rule